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Biological and Species Interaction Survey of Pacific Hake, Sablefish, Spiny Dogfish and Pacific Herring off the Southwest Coast of Vancouver Island, August 1987

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BIOLOGICAL AND SPECIES INTERACTION SURVEY OF PACIFIC HAKE, SABLEFISH, SPINY DOGFISH AND PACIFIC HERRING OFF THE SOUTHWEST COAST OF VANCOUVER ISLAND, AUGUST 1987

by

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ABSTRACT

Shaw, W., R. Tanasichuk, D. M. Ware, and G. A. McFarlane. 1989. Biological and species interaction survey of Pacific hake, sablefish, spiny dogfish and Pacific herring off the southwest coast of Vancouver Island, August 1987. Can. MS Rep. Fish. Aquat. Sci. 2027: 149 p.

A biological and species interaction study was conducted off the southwest coast of Vancouver Island from August 19-29, 1987. Forty trawl hauls, 45 STD casts and 16 vertical plankton tows were completed.

Pacific hake was the dominant fish species in the catch. Hake concentrations occurred in the Bottleneck and south of Finger Bank to the American border. Euphausiids were the most important food item. Pacific herring were next most important; one-third of the herring found in hake stomachs were young-of-the-year. The remainder ranged from 14 to 23 cm and consequently would have been 1+ and older. Herring were found in 7% of the hake sampled. Hake from Barkley Sound were significantly shorter at age than fish collected offshore.

Sablefish dominated bottom trawl catches. Most sablefish were taken on 40 Mile Bank, along the southern margin of Finger Bank, and offshore in the south slope area, adjacent to the 200 m isobath. Hake heads, apparently from foreign factory vessels, were the item most commonly found in the stomachs. Euphausiids, herring and then salps appeared to be the next most important prey items. Herring occurred in 8.4% of the sablefish examined.

Dogfish concentrated around 40 Mile, Finger and Swiftsure banks. Euphausiids and herring were important prey in smaller (<80 cm) dogfish; hake accounted for most of the prey volume in larger fish. Herring represented 13% of the dogfish diet.

Major herring concentrations occurred on 40 Mile and Swiftsure banks and at the South Slope area near the 200 m isobath (or the Rathole). Adult herring were found on 40 Mile Bank; sub-adults dominated at all other locations. Herring fed on euphausiids exclusively; 39% of the fish examined had empty stomachs.

The results of physical oceanographic sampling indicated that there was a body of cold, saline water near the coast and that a cyclonic (counterclockwise) gyre was centered over the Firing Range area. The Juan de Fuca Eddy was not apparent during the survey.

RÉSUMÉ

Shaw, W., R. Tanasichuk, D. M. Ware, and G. A. McFarlane. 1989. Biological and species interaction survey of Pacific hake, sablefish, spiny dogfish and Pacific herring off the southwest coast of Vancouver Island, August 1987. Can. MS Rep. Fish. Aquat. Sci. 2027: 149 p.

Une étude sur les interactions biologiques et les interactions entre espèces a été réalisée au large de la côte sud-ouest de l'île de Vancouver du 19 au 29 août 1987. Quarante traits de chalut, 45 relevés CTP et 16 échantillonnages verticaux du plancton ont été réalisés.

Le merlu du Pacifique s'est révélé l'espèce de poisson dominante dans les prises. Les concentrations de merlus ont été observées dans l'endroit appelé Bottleneck et dans le sud du banc Finger, près de la frontière américaine. La plus importante source d'aliments était constituée par les euphausiacés, suivis par le hareng du Pacifique; le tiers des harengs trouvés dans l'estomac des merlus étaient des jeunes de l'année. Le reste variait de 14 à 23 cm et, par conséquent, était d'âge 1+ et plus. On a trouvé du hareng dans 7 % des merlus échantillonnés. La longueur selon l'âge du merlu provenant de la baie Barkley était nettement plus petite que celle des poissons prélevés au large.

La morue charbonnière a dominé les prises obtenues par chalutage sur le fond. La plupart des morues charbonnières ont été capturées sur le banc 40 Mile, le long de la bordure sud du banc Finger et au large de la région South Slope, près de l'isobathe de 200 m. L'élément le plus souvent recontré dans l'estomac de ces morues était des têtes de merlu, provenant apparemment des navires-usines étrangers. Venaient ensuite, dans l'ordre, les euphausiacés, les harengs et les salpes. Le hareng a été observé dans l'estomac de 8,4 % des morues charbonnières examinées.

L'aiguillat commun était concentré autour des bancs 40 Mile, Finger et Swiftsure. Les euphausiacés et le hareng constituaient des proies importantes pour les aiguillats communs de petite taille (<80 cm); chez les poissons de plus grande taille, le merlu constituait de loin la proie la plus importante. Le hareng constituait 13 % du régime alimentaire de l'aiguillat commun.

Les principales concentrations de hareng ont été observées dans les bancs 40 Mile et Swiftsure ainsi que dans la région de South Slope près de l'isobathe de 200 m (ou Rathole). Les harengs adultes étaient présents dans le banc 40 Mile, tandis que les juvéniles dominaient tous les autres emplacements. Le hareng se nourrit exclusivement d'euphausiacés; 39 % des poissons examinés avaient l'estomac vide.

Les résultats de l'échantillonnage réalisé pour déterminer les caractéristiques océanographiques (physiques) ont révélé la présence d'une masse d'eau salée et froid près de la côte ainsi que la présence d'un tourbillon cyclonique (antihoraire) au-dessus de la région de Firing Range. Le tourbillon de Juan de Fuca n'était pas apparent durant la relevé.

INTRODUCTION

The La Pérouse Project is a multi-species, multi-disciplinary study designed to evaluate the influence of variations in physical and biological oceanographic factors on fish populations utilizing the lower west coast of Vancouver Island. From a fisheries oceanography perspective, the influence of oceanographic variations on groundfish species, in particular Pacific hake (Merluccius productus), and Pacific herring (Clupea harengus pallasi), recruitment is of particular interest.

Every August since the Project's inception in 1985, a fisheries survey has been conducted to determine the distribution, abundance and trophic interactions of the dominant fish species in the La Pérouse Bank area (see Shaw et al. 1987 and 1989). These surveys have provided information on the impact of hake and other predators, such as sablefish (Anoplopoma fimbria) and spiny dogfish (Squalus acanthias), on Pacific herring. In addition, physical (temperature, salinity, density at depth) and biological (zooplankton sampling) oceanographic data were collected.

The main objectives of the 1987 survey were (1) to sample major concentrations of hake, dogfish, sablefish and herring off the southwest coast of Vancouver Island, map their distribution, and determine their diets; (2) to delineate the northern limit of hake distribution off Vancouver Island, and (3) to collect physical oceanographic data from the survey area. This report presents the biological and oceanographic data collected during the survey.

MATERIALS AND METHODS

Two vessels participated in this survey, the commercial trawler F/V CALEDONIAN and the research trawler R/V W. E. RICKER. The F/V CALEDONIAN was responsible for most of the fishing, which occurred between August 19 and 29. The R/V W. E. RICKER was used between August 15 and 31 for: 1) hydro-acoustically estimating the abundance of hake and herring on La Pérouse Bank (results to be presented in a separate report), 2) conducting STD casts and vertical plankton hauls at standardized stations in the study area and, 3) delineating the northern limit of hake distribution along Vancouver Island.

FISHING

The F/V CALEDONIAN and R/V W. E. RICKER were used for fishing. The F/V CALEDONIAN is a 30 m (100 ft) commercial stern trawler powered by a 900 hp diesel engine. Demersal tows were made using an Atlantic Western II box trawl with two 907 kg (2000 lb) steel trawl doors. Mid-water tows were made with a Diamond VIII mid-water trawl equipped with a head-rope transducer. Average vertical mouth openings of the bottom and mid-water trawls were approximately 5.5 and 18 m respectively. The R/V W. E. RICKER is a 66 m (215 ft) stern trawler powered by a 2400 hp diesel engine. Mid-water tows were made with a Diamond VII mid-water trawl equipped with a head-rope transducer. The same size cod-end (10.2 cm stretched mesh) and small mesh liner (3.8 cm stretched mesh) were used for all nets.

Set locations for mid-water trawling were selected on the basis of fish density in the mid-water as determined from echosoundings. Bottom trawl sets were made on trawlable bottom in the survey area.

BIOLOGICAL SAMPLING

The total catch for each tow made by the F/V CALEDONIAN was determined by visually estimating the weight of fish in the cod-end. The weight by species was calculated after assigning a percentage of the total catch to that species. The total catch for each tow made by the R/V W. E. RICKER was separated by species into tubs and weighed on a platform scale to the nearest kg. For both vessels, representative subsamples were collected from large catches using a six-tub subsample method (2 tubs each from the beginning, middle and end of the cod-end), whereas small catches were sampled in their entirety.

Length, sex and stomach contents were recorded for all fish species; in addition, maturity stages of hake were noted (Weir et al. 1978) and otoliths were taken for age determination (Beamish 1979). Length measurements consisted of fork length (tip of the snout to the tip of the middle ray of the caudal fin) for hake and sablefish, total length (tip of the snout to the tip of the caudal fin when depressed in a line horizontal with the body) for spiny dogfish, and standard length (tip of the snout to the hind margin of the hypural bone of the tail) for herring. An attempt was made to examine a minimum of 10 stomachs per sex and centimetre interval for each species from each haul. Prey items were identified to the lowest possible taxon and volume in each

stomach determined (Shaw et al. 1987). State of digestion was also recorded. Standard length of herring found in the stomachs of fish examined on-board the vessel was measured.

Random samples of herring from selected tows were put into buckets, frozen and brought back to the laboratory. These fish were sampled for standard length, total weight, stomach contents; scales were removed for age determination.

OCEANOGRAPHIC SAMPLING

Physical oceanographic data were collected from standard STD stations (Table 1) using an STD-12 (Applied Microsystems Ltd., Sidney, B.C.) oceanographic probe. Water properties such as temperature, salinity and density were sampled every 2 metres (see Shaw et al. 1987). Casts were made to within 5 m of bottom or to 500 m, where possible.

A modified bongo net, with 230 μm mesh nets, was used for vertical plankton hauls. The sample from one net was stored in a labelled plastic bag and frozen, while the other sample was stored in a labelled jar and preserved in 7% buffered formalin. Vertical hauls were made to within 5 m of bottom or to 250 m, where possible.

RESULTS AND DISCUSSION

FISHING AND ECHOSOUNDING

Forty trawl hauls were completed using the F/V CALEDONIAN. Eighteen bottom and 22 mid-water tows were made between August 19 and 22, and August 23 and 29, respectively. Seven mid-water tows were made with the R/V W. E. RICKER between August 25 and 29. The La Pérouse Project fishing subareas are illustrated in Figure 1 and the following is a summary of tows with the F/V CALEDONIAN by subarea:

Fishing subarea	No. of tows	
	Bottom trawl	Mid-water trawl
Barkley Sound		1
Firing Range	1	2
Potholes		1
12 Mile Bank		1
40 Mile Bank	4	8
Finger Bank	4	2
Bottleneck	1	1 (2)[a]
Swiftsure Bank		1
Eddy	4	2
South Slope	3	3
Central Slope	1	

[a] two sets made by the R/V W.E. RICKER

The R/V W. E. RICKER made 7 sets: 2 in the Bottleneck area of the La Pérouse Bank, 2 off Sydney Inlet, 1 off Kyuquot Sound, 1 off Quatsino Sound, and 1 off Triangle Island.

Fishing locations are illustrated in Figure 2. Detailed catch data by set for the F/V CALEDONIAN and the R/V W. E. RICKER are presented in Appendix Tables 1 and 2 respectively.

Thirty-six species of fish were captured during the survey. A list of species' common and scientific names is given in Table 2. The total catch by species for both vessels during the survey was:

Species	Weight (kg)	% Total catch
Pacific hake	42559	58.2
Pacific herring	9874	13.5
Spiny dogfish	7439	10.2
Redstripe rockfish	3643	5.0
Walleye pollock	2525	3.5
Sablefish	1832	2.5
Canary rockfish	1058	1.5
Other species	4253	5.6
Total	73183	100.0

Total weight of each species in the "other species" category was less than 1% of the total catch.

The distribution and biological sampling results by species are discussed below:

PACIFIC HAKE

Offshore waters

Echosoundings indicated large mid-water concentrations of Pacific hake in the Bottleneck, and adjacent to Finger Bank extending into the Eddy region towards the 200 m isobath (US-CDN International border) (Fig. 3). Catch rates in those areas corroborate the abundance of hake (Fig. 4). Hake concentrations declined west of the La Pérouse study area with only small isolated schools seen as far as Triangle Island (Fig. 5).

Summaries of the biological samples collected aboard both vessels are given in Tables 3 and 4.

Hake caught during the survey by the F/V CALEDONIAN ranged from 36 to 76 cm long (Fig. 6). In the bottom trawl catches, females and males ranged from 40 to 73 cm and from 43 to 67 cm respectively. Modes occurred at 50 and 56 cm for females, and at 48 cm for males (Appendix Table 3). In the mid-water trawl catches, female hake ranged from 36 to 76 cm and males from 37 to 62 cm. Modal lengths of 48 cm for females and 46 cm for males were slightly lower than in the bottom trawl catches. However, these modes are 1 cm greater than those reported for 1986 (Shaw et al. 1989). Approximately 14% and 3% of the females sampled in the bottom and mid-water trawl catches respectively, were longer than 60 cm. Only 2 and 0.3% of the males caught in the bottom and mid-water trawl catches respectively were 60 cm or longer. Female hake accounted for 74% and 60% of the bottom and mid-water trawl catches respectively.

Hake caught by the R/V W. E. RICKER during the survey ranged from 33 to 66 cm long (Appendix Table 4). Modal lengths of hake sampled north of La Pérouse Bank were slightly smaller than those on the Bank. Modal lengths of hake collected off Triangle Island and Kyuquot Sound were 46 and 44-45 cm respectively in contrast with modes at 49 and 52 cm for fish captured on La Pérouse Bank. In all areas fished, females dominated.

Pacific hake caught on La Pérouse Bank (sets 21, 24, 32, 33) and off Triangle Island (set 1) ranged from 2-17 years of age (Tables 5 and 6 respectively). Ages 7 and 10 fish (1980, 1977 year-classes, respectively) (Fig. 7) predominated and accounted for 74% and 11% respectively of all hake sampled on La

Pérouse Bank and 66% and 15% respectively of all hake samples off Triangle Island. The strong 1970 and 1973 year-classes were still evident in both areas.

Mean lengths at age of hake off Triangle Island and La Pérouse Bank were similar. Growth rates were relatively high to age 3 (Fig. 7). Growth curves for males and females were fitted using the following von Bertalanffy parameters:

La Pérouse Bank

	t_o	K	L ∞ (cm)
Males	-16.66	0.051	66.7
Females	-5.49	0.144	58.6
Sexes combined	-7.95	0.116	58.5

Triangle Island

	t_o	K	L ∞ (cm)
Males	-1.79	0.218	54.9
Females	-5.32	0.148	58.2
Sexes combined	-3.70	0.177	56.7

The between area differences in the above parameters for male hake are due to the absence of age 2 fish and fewer, smaller age 3 fish on the La Pérouse Bank. In contrast female hake of all ages were well represented in both areas, and there is no difference in the growth parameters. The maximum size at age for both males and females (L ∞) is about 3 cm longer during this survey as compared to the 1983 survey results (Shaw et al. 1985).

Maturity states of 741 male and 1317 female hake were recorded (Tables 7 and 8). For F/V CALEDONIAN samples, thirty-eight percent of the males were in an early ripening (R1) stage, and 46% were in a resting (Rt) stage. Approximately 23% and 56% of the females were in stages R2 and Rt respectively. The majority of the hake sampled north of La Pérouse Bank were in an early ripening state. This is in contrast to hake sampled on the Bank itself where most of the hake were at a resting stage.

A stratified length-weight sample for hake was collected with the R/V W.E. RICKER. Although no age-weight sample is available from this survey, a stratified length-age-weight sample for hake collected near the end of July is available and the resulting age-weight relationship should provide reasonable weight estimates for fish collected in August. The length-age-weight equations for both periods are:

Length/weight

(July)

Males	Wt(gm)	=	$0.0622*(FL(cm))^{2.4014}$	n =128
Females	Wt(gm)	=	$0.0286*(FL(cm))^{2.6093}$	n =149
Sexes combined	Wt(gm)	=	$0.0349*(FL(cm))^{2.5548}$	n =277

(August)

Males	Wt(gm)	=	$0.0833*(FL(cm))^{2.3523}$	n =100
Females	Wt(gm)	=	$0.0162*(FL(cm))^{2.7772}$	n =156
Sexes combined	Wt(gm)	=	$0.0153*(FL(cm))^{2.7877}$	n =256

Age/weight

(July)

Males	Wt(gm)	=	$295.42*(Age(yr))^{0.4173}$	n =128
Females	Wt(gm)	=	$238.28*(Age(yr))^{0.5774}$	n =149
Sexes combined	Wt(gm)	=	$264.76*(Age(yr))^{0.5001}$	n =277

Results of stomach content analyses for hake collected offshore were segregated by being north or south of the 49° latitude. The northern region extended offshore to Triangle Island while the southern region was the La Pérouse Bank survey area (Fig. 2). The most important prey item for hake collected in the northern region was euphausiid (64% by volume) (Table 9). Pacific herring was the next most important prey item (36%); 5.1% of the hake captured contained herring, which were all at least 19 cm long (Table 10). Hake smaller than 50 cm fed mostly on euphausiids whereas larger hake fed mainly on herring. The average stomach volume, excluding fish with everted stomachs, was 16.8 c.c.

Stomachs from hake collected from the southern region contained primarily euphausiids (65%), mainly Thysanoessa spinifera, and herring (29%). A total of 118 herring were identified in 97 hake stomachs. There appeared to be two size groups of herring; 6 to 9 cm fish (young-of-the-year) accounting for 33% of herring as prey, and 14 to 23 cm fish accounting for the remainder. The diet of hake appeared to shift progressively with size; hake smaller than 40 cm fed only on euphausiids, and hake 60 cm and larger fed mainly on herring and secondarily on euphausiids. If hake with everted stomachs were excluded then 7.2% of the hake from the southern region contained herring; and the average stomach volume of hake was 26.9 c.c.

Inshore waters

Echosoundings indicated that large concentrations of hake were present in Trevor Channel (Barkley Sound) and up to the entrance of Alberni Inlet. Echograms showed two separate mid-water concentrations, a shallow layer appearing to be a dense plankton layer ranging in depth from 66-73 m and a deeper layer of hake ranging in depth from 77-91 m. The plankton layer contained high concentrations of glass shrimp, herring, and euphausiids.

A summary of the biological samples collected is presented in Table 3.

Hake caught in Trevor Channel ranged from 23 to 44 cm long (Appendix Table 3). Males ranged from 26 to 42 cm with a mode at 35 cm. Females ranged from 23 to 44 cm with a mode at 37 cm. Female hake accounted for 50% of the mid-water trawl catch. These results are similar to those found in 1986 (Shaw et al. 1989).

Hake in Trevor Channel varied from 2 to 7 years old with modes at 4 and 6 years (1983 and 1981 year-classes respectively) (Table 11, Fig. 7), again, similar to the 1986 results (Shaw et al. 1989).

Growth rates were relatively high to age 2 (Fig. 7). Growth curves for males and females were fitted using the following von Bertalanffy parameters:

	t_o	K	L_∞ (cm)
Males	0.089	1.116	36.6
Females	-8.050	0.187	41.7
Sexes combined	-1.920	0.579	38.0

Mean length at age was significantly smaller (t-test $P<.05$) than that for hake found on La Pérouse Bank or off Triangle Island. The hake in Trevor Channel probably represent a separate, resident stock.

The maturity stages of 47 males and 53 females were recorded (Table 7). Approximately 53% of the males were immature (I2) and 55% of the females were starting to mature (R1); maturing fish were recruit spawners, i.e., fish maturing for the first time.

Stomach content analysis indicated that euphausiid (86 % of total prey volume) and herring (12 %) were the most important prey items (Table 12). Thirteen herring (5-6 cm) (Table

10) were identified in 4 hake stomachs. These small herring were also found in the shallow plankton layer in Trevor Channel. As described above for offshore hake, there appears to be a transition from euphausiid to herring feeding with an increase in fish size. After ignoring hake with everted stomachs, we estimate that 6% of the hake sampled in Trevor Channel fed on herring. The average volume of food per stomach (excluding everted stomachs) was 7.8 cc for inshore hake.

SABLEFISH

All sablefish were sampled from offshore waters. Sablefish were caught in 14 bottom tows and one mid-water tow. Most of the sablefish were caught on 40 Mile Bank, on the eastern edge of the Finger Bank, and offshore in the south slope area adjacent to the 200 m isobath. Biological samples were taken from all tows. A summary of the biological sampling is presented in Table 13.

The range in sablefish length (36 to 84 cm) (Appendix Table 5; Fig. 8), is similar to that described for past surveys (Shaw et al. 1987 and 1989). Males and females ranged in length from 36-76 cm and 36-84 cm respectively. The majority of small fish (36-55 cm) were caught at 40 Mile Bank whereas most of the larger fish were caught west of the Finger Bank and towards the 200 m isobath. Small sablefish (<55 cm) accounted for 43% of the total catch from all areas. Males accounted for 62% of the total sablefish catch.

The maturity states of 308 males and 192 females were recorded (Table 14). Most males (43%) were immature (I2) and 39% were in an early stage of maturity (R1). Approximately 43% of the females were immature with 24% in each early maturity stage (R1 and R2).

Stomachs were examined for fish collected in the southern region only. The principal prey (% by volume) identified in the stomachs were Pacific hake heads (37 %) (Table 15). These heads originate from dumping by the foreign factory vessels operating in the vicinity. Rockfish heads, apparently from the same source, were identified in the stomachs as well. These food items were found in fish larger than 50 cm. Euphausiids (20 %) and Pacific herring (14 %) were the next most important food items found in most sizes of fish. Salps, a jellyfish-like animal related to vertebrates, accounted for 9% by volume of the diet, and were found in most size of fish. Forty-two herring were identified in 42 sablefish stomachs. These

herring ranged in standard length from 13 to 25 cm (Table 10). If sablefish with everted stomachs are ignored then about 8.4% of sablefish contained Pacific herring. The average volume of food per stomach (excluding everted stomachs) for sablefish was 89.6 cc.

SPINY DOGFISH

All spiny dogfish sampled were from offshore waters. The majority of dogfish were caught around Finger and 40 Mile banks in bottom trawls, and around 40 Mile Bank and Swiftsure Bank in mid-water trawls. Spiny dogfish were present in 50% of the bottom sets and 14% of the mid-water sets. Biological samples were collected from all sets. A summary of the biological samples collected is presented in Table 16.

Dogfish caught by bottom or mid-water trawl ranged in length from 44 to 118 cm, and from 52 to 94 cm respectively (Appendix Table 6; Fig. 9). Length frequency modes occurred at 61 and 86 cm, and at 65 cm, for fish caught in mid-water and bottom tows respectively. Juvenile dogfish (<=60 cm) accounted for 11% of the total dogfish catch. Male dogfish accounted for 64% of the total dogfish catch.

Stomach contents were examined only for fish from the southern region. Euphausiids accounted for 59% of the total prey volume (Table 17) and were found in all size ranges of fish. Fish appeared to become progressively more important in the diet as dogfish size increased; in fact, hake was the most important prey item for dogfish longer than 80 cm. Pacific herring accounted for 13% of the diet. Thirty-two dogfish contained herring. Only 25 herring were measurable; these ranged from 8 to 22 cm with the majority ranging from 15 to 22 cm (Table 10). One young-of-the-year herring (8 cm) occurred in a dogfish caught at Swiftsure Bank. As for sablefish, hake heads also occurred in dogfish stomachs. If dogfish with empty stomachs were ignored then about 10% of the dogfish contained herring. The average volume of food per stomach (excluding empty stomachs) for dogfish was 31.2 cc.

PACIFIC HERRING

Major concentrations of herring were located on the northern part of 40 Mile Bank, in Subarea 12 (around the Rathole which is at the head of Nitinat Canyon, near the 200 m isobath), and on the south-west edge of Swiftsure Bank (Fig. 10). A minor concentration of herring was found near the Firing Range. Young-of-the-year (age 0+) could not be captured because of the coarseness of the nets used; however, stomach content analysis results suggested that 0+ herring occurred in Barkley Sound and at the Firing Range.

Tables 18 and 19 summarize the results of biological sampling. The majority of the fish collected at 40 Mile Bank were age 2+ and older (pre-recruit and adult fish) whereas, at all other locations, 1+ and 2+ (pre-recruits) dominated.

Results of stomach content analyses indicated that herring fed exclusively on euphausiids. Although the data are somewhat fragmentary, it appears that herring fed on euphausiids in mid-morning and mid-afternoon. Thirty-nine percent of the 459 stomachs examined were empty. Euphausiids accounted for a maximum of 8.8% of the body weight of herring; these fish were captured during Set 20 which was made at the Firing Range.

OTHER SPECIES

A summary of the other species sampled is presented in Table 20. The length frequencies for walleye pollock, lingcod, chinook salmon, halibut, and redstripe rockfish are presented in Appendix Tables 7-11, respectively.

Maturity stages were recorded for some of these species. For walleye pollock, 98 % of the females were in a resting stage (Rt) and 69 % of the males were immature (I2). Twelve halibut were examined for maturity; 92 % were immature (I2). All lingcod examined were in a resting stage.

A summary of the diets of walleye pollock, chinook salmon, lingcod, and halibut is presented in Table 21. Pacific herring appeared to be the most important food item for chinook salmon, lingcod and halibut. Herring found in lingcod and chinook salmon stomachs ranged in length from 14 to 25 cm, and from 15 to 22 cm respectively (Table 10).

OCEANOGRAPHIC SAMPLING

STD casts were made at 45 stations (Fig. 11). The STD sampling results (Thomson, pers.comm.) are presented by surface, 50 m and 100 m depth intervals. The following were examined: sea temperature in °C (Figs. 12-14); salinity in ‰ (Figs. 15-17); density or sigma-t (σ) (Figs. 18-20); and, current velocity (cm/sec) relative to 100 m (Fig. 21). There appear to have been two dominant oceanographic features in existence during the survey period; a body of high salinity, cold water near the coast extending northward to Cape Beale and, immediately northward of it, a cyclonic (counterclockwise rotating) gyre.

Vertical plankton hauls were completed at 16 stations (Fig. 22). Crustacean zooplankton (euphausiids, copepods) biomass was relatively low and salps dominated the zooplankton in the continental slope waters.

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Table 1. STD and vertical plankton haul station positions for the La Pérouse Bank field survey, August 21-23, 1987. R/V W. E. RICKER.

STATION ID NO.	LATITUDE N.	LONGITUDE W.	APP. DEPTH m	TASKS	DATE (AUG)
BA1(E1)	48 31.70	125 03.80	100	STD, PH	22
BA2(C2)	48 25.40	125 07.80	115	STD, PH	22
BA3(C3)	48 23.45	125 20.80	120	STD, PH	22
LB1	48 40.40	125 59.48	30	STD	22
LB2	48 39.00	125 02.40	55	STD	22
LB3	48 37.32	125 05.58	92	STD	22
LB4	48 35.67	125 08.72	105	STD	22
LB5	48 34.00	125 12.00	95	STD	22
LB6	48 32.18	125 15.51	110	STD	22
LB7	48 28.68	125 22.10	152	STD	21
LB8	48 25.30	125 28.65	145	STD	21
LB9	48 22.00	125 34.80	135	STD	21
LB10	48 18.57	125 41.35	150	STD	21
LB11	48 15.20	125 47.75	200	STD	21
LB12	48 12.92	125 51.90	510	STD	21
LB13	48 10.60	125 56.12	810	STD	21
LB14	48 08.48	126 00.00	1180	STD	21
LB15	48 04.36	126 08.46	1450	STD	21
LB16	48 00.53	126 17.00	1530	STD	21
CB1	48 44.94	125 22.00	75	STD, PH	22
CB2	48 41.15	125 27.05	100	STD, PH	22
CB3(B8)	48 34.50	125 30.00	120	STD, PH	22
CB4(B7)	48 32.00	125 35.50	76	STD, PH	21
CB5	48 28.30	125 49.80	110	STD, PH	21
CB6(A2)	48 22.70	126 03.80	400	STD, PH	21
B1	48 45.27	125 33.88	145	STD, PH	22
B5	48 40.60	125 46.25	90	STD, PH	22
LC1	48 50.44	125 27.73	90	STD	22
LC2	48 48.68	125 30.95	105	STD	22
LC3	48 46.95	125 34.24	130	STD	22
LC4	48 43.43	125 40.80	162	STD	22
LC5	48 39.94	125 47.40	90	STD	22
LC6(B6)	48 36.46	125 54.00	95	STD, PH	22
LC7	48 32.96	126 00.50	125	STD	22
LC8	48 29.45	126 07.10	197	STD	22
LC9	48 25.94	126 13.70	660	STD	22
LC10	48 22.40	126 20.20	1150	STD	22
LC11	48 18.95	126 26.70	1470	STD	22
LC12(A4)	48 15.00	126 40.00	-	STD	22

Table 1 (cont'd)

STATION ID NO.	LATITUDE N.	LONGITUDE W.	APP. DEPTH m	TASKS	DATE (AUG)
A1	48 24.60	126 11.33	500	STD, PH	22
A3	48 24.70	126 15.80	900	STD, PH	22
B3	48 51.08	125 39.20	45	STD, PH	23
LD1	49 00.10	125 43.80	33	STD	23
LD2(D1)	48 58.35	125 47.05	42	STD, PH	23
LD3	48 56.61	125 50.40	43	STD	23
LD4(D2)	48 53.16	125 57.00	60	STD, PH	23
LD5	48 49.65	126 03.60	85	STD	23
LD6	48 46.18	126 10.20	135	STD	23
LD7	48 42.67	126 16.80	475	STD	23
LD8	48 39.17	126 23.40	760	STD	23
LD9	48 35.69	126 30.00	1095	STD	23
LD10	48 32.20	126 36.60	1475	STD	23
LD11	48 28.76	126 42.94	1560	STD	23

STD=salinity, temperature, depth profile
PH =plankton haul station

Table 2. Common and scientific names of fish species captured during the August 1987 cruise.

Common name	Scientific name
Pacific hake	Merluccius productus
Sablefish	Anoplopoma fimbria
Spiny dogfish	Squalus acanthias
Pacific herring	Clupea harengus pallasi
Arrowtooth flounder	Atheresthes stomias
Dover sole	Microstomus pacificus
English sole	Parophrys vetulus
Flathead sole	Hippoglossoides elassodon
Pacific halibut	Hippoglossus stenolepis
Rock sole	Lepidopsetta bilineata
Rex sole	Glyptocephalus zachirus
Shortraker rockfish	Sebastes aleutianus
Pacific ocean perch	Sebastes alutus
Redbanded rockfish	Sebastes babcocki
Darkblotched rockfish	Sebastes crameri
Greenstripe rockfish	Sebastes elongatus
Widow rockfish	Sebastes entomelas
Yellowtail rockfish	Sebastes flavidus
Boccacio rockfish	Sebastes paucispinis
Canary rockfish	Sebastes pinniger
Redstripe rockfish	Sebastes proriger
Yellowmouth rockfish	Sebastes reedi
Yelloweye rockfish	Sebastes ruberimus
Sharpchin rockfish	Sebastes zacentrus
Shortspine thornyhead	Sebastolobus alascanus
American shad	Alosa sapidissima
Chinook salmon	Oncorhynchus tshawytscha
Sockeye salmon	Oncorhynchus nerka
Eulachon	Thaleichthys pacificus
Lingcod	Ophiodon elongatus
Northern anchovy	Engraulis mordax mordax
Pacific cod	Gadus macrocephalus
Walleye pollock	Theragra chalcogramma
Ratfish	Hydrolagus colliei
Big skate	Raja binoculata
Pacific lamprey	Lampetra tridentatus

Table 3. Summary of Pacific hake sampled. F/V CALEDONIAN, August 19-29, 1987. (T.C. = total catch).

Set[a] no.	Average net depth (m)	Length			Maturity	Paired otoliths	Stomachs examined	Remarks
		M	F	T				
1	155	26	60	86	86		86	Random
2	120	5	86	91	91		91	Random
7	146	64	90	154	154		154	Random
10	89	16	77	93	93		93	Random
11	185	1	11	12	12		12	T.C.
13	101	5	24	29	29		29	T.C.
15	148	21	56	77	-		77	T.C.
16	148	11	32	43	43	43	-	T.C.[b]
17	63	8	18	26	26	26	-	T.C.[b]
19[c]	84	100	100	200	100	100	100	Random
21	57	81	141	222	148	148	148	Random
22	82	129	165	294	121	31	31	Random[b]
23	95	91	180	271	137	138	138	Random
29	110	138	182	320	154	158	158	Random
32	94	119	187	306	152	152	152	Random
33	131	173	182	355	180	180	180	Random
35	77	33	67	100	48			Random
37	102	33	67	100	59			Random
38		46	87	133	-			Random
40	106	40	93	133	33			Random
Total		1140	1905	3045	1666	976	1449	

[a]Sets 1-19 are bottom trawl samples and 20-40 are midwater trawl samples.
[b]Fish collected for parasite examination.
[c]Set made in the Trevor Channel.

Table 4. Summary of Pacific hake sampled. R/V W. E. RICKER, August 15-31, 1987.

Set no.	Average net depth (m)	Length			Maturity	Paired otoliths	Stomach examined	Weight	Remarks
		M	F	T					
1	100	60	94	154	154	154	154	-	Random
3	-	106	93	199	199	200	200	-	Random
6[a]	102	13	27	40	40	-	-	-	Selected
7[b]	100	122	161	283	99	258	-	257	Stratified
Total		301	375	676	492	612	354	257	

[a]Fish selected for electrophoretic analysis.
[b]Body weight measured from all fish of which 156 ovaries were weighed. In addition tissue samples from 40 fish were taken for electrophoretic analysis.

Table 5. Mean size (cm) at age of Pacific hake caught offshore. F/V CALEDONIAN, August 19-29, 1987.

Age (yr)	Number			Average length (cm)			Standard error		
	M	F	T	M	F	T	M	F	T
3	2	4	6	45.0	43.5	44.0	1.00	1.55	1.06
4	1	3	4	45.0	42.3	43.0	0.00	1.20	1.08
5	1	-	1	49.0	0	49.0	0.00	0.00	0.00
6	6	11	17	45.3	48.2	47.2	1.41	1.55	1.14
7	169	301	470	46.8	48.7	48.1	0.20	0.21	0.16
8	10	9	19	47.5	50.1	48.7	1.25	1.25	0.91
9	10	9	19	49.7	52.7	51.1	1.08	1.03	0.81
10	34	35	69	49.9	53.5	51.7	0.44	0.60	0.43
11	2	2	4	48.0	53.5	50.8	2.00	3.50	2.29
12	2	1	3	53.5	51.0	52.7	4.50	0.00	2.73
13	2	6	8	52.5	53.3	53.1	0.50	1.20	0.90
14	4	2	6	52.8	55.0	53.5	0.75	1.00	0.72
15	1	1	2	55.0	51.0	53.0	0.00	0.00	2.00
16	-	1	1	0	62.0	62.0	0	0.00	0.00
17	2	3	5	54.0	53.3	53.6	0.00	1.67	0.93
Total	246	388	634						

Table 6. Mean size (cm) at age of Pacific hake caught off Triangle Island. R/V W.E. RICKER, August 15-31, 1987.

Age	Number			Average length (cm)			Standard error		
(yr)	M	F	T	M	F	T	M	F	T
3	1	2	3	37.0	42.0	40.3	0.00	6.00	3.84
4	-	-	-	0	0	0	0	0	0
5	-	-	-	0	0	0	0	0	0
6	-	1	1	0.0	49.0	49.0	0.00	0.00	0.00
7	40	61	101	46.5	48.6	47.8	0.44	0.52	0.37
8	4	6	10	50.8	51.3	51.1	1.93	1.05	0.94
9	1	5	6	52.0	51.0	51.2	0.00	1.52	1.25
10	10	13	23	51.3	53.7	52.7	0.50	1.16	0.72
11	0	1	1	0.0	46.0	46.0	0.00	0.00	0.00
12	1	0	1	51.0	0.0	51.0	0.00	0.00	0.00
13	1	2	3	53.0	53.5	53.3	0.00	1.50	0.88
14	1	2	3	52.0	52.5	52.3	0.00	2.50	1.45
15	-	-	-	0	0	0	0	0	0
16	-	-	-	0	0	0	0	0	0
17	1	1	2	52.0	58.0	55.0	0.00	0.00	3.00
Total	60	94	154						

Table 7. Pacific hake maturity frequency. F/V CALEDONIAN, August 19-29, 1987.

Set no.	1			2			7			10		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	-	-	-	-	-	-	-	-	-	-	1	1
R1	10	6	16	2	8	10	25	15	40	4	15	19
R2	16	47	63	3	60	63	39	65	104	12	43	55
R	-	0	0	-	0	0	-	0	0	-	0	0
1R	-	0	0	-	0	0	-	0	0	-	0	0
2R	-	0	0	-	0	0	-	0	0	-	0	0
RR	-	0	0	-	0	0	-	0	0	-	0	0
S	-	0	0	-	0	0	-	0	0	-	0	0
Rb	-	1	1	-	11	11	-	5	5	-	9	9
Rc	-	0	0	-	0	0	-	0	0	-	0	0
Rt	-	6	6	-	7	7	-	5	5	-	9	9
Total	26	60	86	5	86	91	64	90	154	16	77	93

Set no.	11			13			16			17		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	-	-	-	-	-	-	-	-	-	-	-	-
R1	1	1	2	1	10	11	9	14	23	7	5	12
R2	-	2	2	3	5	8	2	5	7	1	5	6
R	-	0	0	0	0	0	-	0	0	-	0	0
1R	-	0	0	0	0	0	-	0	0	-	0	0
2R	-	0	0	0	0	0	-	0	0	-	0	0
RR	-	0	0	0	0	0	-	0	0	-	0	0
S	-	0	0	0	0	0	-	0	0	-	0	0
Rb	-	0	0	0	0	0	-	0	0	-	0	0
Rc	-	0	0	0	0	0	-	0	0	-	0	0
Rt	-	8	8	1	9	10	-	13	13	-	8	8
Total	1	11	12	5	24	29	11	32	43	8	18	26

Table 7 (cont'd)

Set no.	19[a]			21			22			23		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	25	23	48	–	–	–	–	–	–	–	–	–
R1	21	29	50	25	38	63	7	12	19	14	8	22
R2	0	0	0	0	0	0	0	0	0	0	0	0
R	0	0	0	0	0	0	0	0	0	0	0	0
1R	0	0	0	0	0	0	0	0	0	0	0	0
2R	0	0	0	0	0	0	0	0	0	0	0	0
RR	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0	0	0
Rb	0	0	0	0	0	0	0	0	0	0	0	0
Rc	0	0	0	0	0	0	0	0	0	0	0	0
Rt	1	1	2	11	74	85	47	55	102	39	76	115
Total	47	53	100	36	112	148	54	67	121	53	84	137

Set no.	29			32			33			35		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	–	–	–	–	–	–	–	–	–	–	–	–
R1	12	4	16	22	6	28	31	9	40	12	13	25
R2	0	0	0	0	0	0	0	0	0	4	0	4
R	0	0	0	0	0	0	0	0	0	0	0	0
1R	0	0	0	0	0	0	0	0	0	0	0	0
2R	0	0	0	0	0	0	0	0	0	0	0	0
RR	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0	0	0
Rb	0	0	0	0	0	0	0	0	0	0	0	0
Rc	0	0	0	0	0	0	0	0	0	0	0	0
Rt	50	88	138	39	85	124	56	84	140	1	18	19
Total	62	92	154	61	91	152	87	93	180	17	31	48

Table 7 (cont'd)

Set no. Gonad maturity stage	37			40			Total		
	M	F	T	M	F	T	M	F	T
I2	-	1	1	-	-	-	25	25	50
R1	12	20	32	12	11	23	227	224	451
R2	7	0	7	1	1	2	88	233	321
R	-	0	0	-	0	0	0	0	0
1R	-	0	0	-	0	0	0	0	0
2R	-	0	0	-	0	0	0	0	0
RR	-	0	0	-	0	0	0	0	0
S	-	0	0	-	0	0	0	0	0
Rb	-	0	0	-	0	0	0	26	26
Rc	-	0	0	-	0	0	0	0	0
Rt	-	19	19	-	8	8	245	573	818
Total	19	40	59	13	20	33	585	1081	1666

[a]Set made in Trevor Channel.

Table 8. Pacific hake maturity frequency. R/V W. E. RICKER, August 15-31, 1987.

Set no.	1			3			6			7		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	-	1	1	-	-	-	-	-	-	-	-	-
R1	48	37	85	94	67	161	1	-	1	3	12	15
R2	11	3	14	12	1	13	0	-	0	0	0	0
R	0	0	0	-	0	0	0	-	0	0	0	0
1R	0	0	0	-	0	0	0	-	0	0	0	0
2R	0	0	0	-	0	0	0	-	0	0	0	0
RR	0	0	0	-	0	0	0	-	0	0	0	0
S	0	0	0	-	0	0	0	-	0	0	0	0
Rb	0	2	2	-	0	0	0	-	0	0	0	0
Rc	0	1	1	-	0	0	0	-	0	0	0	0
Rt	1	50	51	-	25	25	12	27	39	21	63	84
Total	60	94	154	106	93	199	13	27	40	24	75	99

Gonad maturity stage	TOTAL		
	M	F	T
I2	-	1	1
R1	146	116	262
R2	23	4	27
R	0	0	0
1R	0	0	0
2R	0	0	0
RR	0	0	0
S	0	0	0
Rb	0	2	2
Rc	0	1	1
Rt	34	165	199
Total	203	289	492

Table 9. Pacific hake stomach contents by size category of hake from offshore areas located north and south of 49°00' latitude off Vancouver Island, August 1987.

	Size category (cm)					
	30-39	40-49	50-59	60-69	70-79	Total
North						
Stomachs examined	3	227	122	2	-	354
Stomachs everted	-	11	11	-	-	22
Stomachs empty	-	65	57	1	-	123
Stomach contents	3	151	54	1	-	209
Diet volume (cc)						
Pacific herring	-	-	3000 (16)	200 (1)	-	3200 (17)[a]
Myctophidae	-	5	-	-	-	5 (1)
Unid. remains	-	-	10	-	-	10 (1)
Euphausiid	42	4552	1123	-	-	5717 (194)
Squid (sp.)	-	T[b]	-	-	-	T (1)
Total (cc)	42	4557	4133	200	-	8932 cc
South						
Stomachs examined	2	592	905	92	6	1597
Stomachs everted	-	71	158	24	1	254
Stomachs empty	-	85	154	16	-	255
Stomach contents	2	436	593	52	5	1088
Diet volume (cc)						
Pacific herring	-	355 (17)	3969 (54)	2021 (23)	210 (3)	6555 (97)
Eulachon	-	81	364	30		475 (18)
Myctophidae	-	30	2	-		32 (4)
Fish remains (unid.)	-	8	205	187		400 (13)
Unid. remains	-	-	90	28	10	128 (12)
Euphausiid	31	5752	8149	697	35	14664 (1027)
Pink shrimp	9	97	243	10		359 (36)
Jellyfish	-	5	5	-		10 (2)
Turkey feet	-	-	5	-		5 (1)
Total (cc)	40	6328	13032	2973	255	22628 cc

[a]Frequency of hake stomachs in brackets.
[b]T=trace, less than 1 cc.

Table 10. Length frequency of Pacific herring identified in the stomachs by predator and by haul number. F/V CALEDONIAN, August 19-29, 1987.

Standard length (cm)	Predator																			
	Pacific hake																	Pacific hake (R/V W.E. RICKER)		
	1	2	7	13	15	19[a]	21	22	23	29	32	33	35	37	38	40	T	1	3	T
5						1											1			
6						12	2		1		4	1				1	21			
7	1							1		5		1				1	9			
8		1								1		1					3			
9		1										2	2				5			
10																				
11																				
12																				
13																				
14								2			1						3			
15		1		2	1			1					2	1			8			
16				2			1	1	1	1	1		1		1	1	10			
17	1			3	2		1	1	1	1				1			11			
18	1			5	1			2		2	1		1	2		1	16			
19	1	1		2				1		1		1	1		1		9		1	1
20	1	2	1	4				1	1		1					1	12	1	2	3
21		1		1									1	2			5	2		2
22	1	1									1						3	3	1	4
23	1												1				2	5		5
24																		1		1
25																				
Total	7	8	1	19	4	13	4	10	4	11	9	6	9	6	2	5	118	12	4	16

Table 10 (cont'd)

Standard length	Predator																		
	Spiny dogfish				Sablefish							Lingcod				Chinook salmon			
(cm)	12	24	34	T	2	4	8	11	12	14	T	14	17	18	T	24	25	30	T
5																			
6																			
7																			
8		1		1															
9																			
10																			
11																			
12																			
13					1														
14											1								
15		3		3										1	1	1			1
16		11	1	12	1						1		1	1	2	1			1
17			1	1		1		1			2		1	1	2				
18	1	1		2	4		1			1	6			1	1				
19	2			2	4		2				6								
20			2	2	3	1	2		1	1	8	2		8	10	1			1
21					6		1			1	8	2	2	6	10		1		1
22			2	2	3		1				4			9	9			1	1
23					3		1				4			8	8				
24					1						1								
25										1	1			1	1				
Total	3	16	6	25	26	2	8	1	1	4	42	4	4	36	44	3	1	1	5

[a]Set made in an inlet.

Table 11. Mean size (cm) at age of Pacific hake caught in Trevor Channel. F/V CALEDONIAN, August 19-29, 1987.

Age (yr)	Number			Average length (cm)			Standard error		
	M	F	T	M	F	T	M	F	T
2	1	1	2	32.0	36.0	34.0	0.00	0.00	2.00
3	3	3	6	35.7	35.7	35.7	1.20	0.33	0.56
4	18	28	46	36.0	37.4	36.8	0.28	0.29	0.23
5	1	-	1	35.0	0	35.0	0.00	0	0.00
6	24	18	42	36.6	38.6	37.5	0.32	0.41	0.29
7	-	3	3	-	39.3	39.3	-	0.88	0.88
Total	47	53	100						

Table 12. Pacific hake stomach contents by size category of hake from Trevor Channel in Barkley Sound, August 1987.

	Size category			
	20-29	30-39	40-49	Total
Stomachs examined	2	86	12	100
Stomachs everted	-	1	-	1
Stomachs empty	-	27	3	30
Stomach contents	2	58	9	69
Diet volume (cc)				
Pacific herring	-	11 (2)	80 (2)	91 (4)[a]
Fish remains (unid.)	-	13	-	13 (2)
Euphausiid	12	601	53	666(68)
Total (cc)	12	625	133	770 cc

[a]Frequency of hake stomachs in brackets.

Table 13. Summary of sablefish sampled. F/V CALEDONIAN, August 19-29, 1987.

Set[a] no.	Average net depth (m)	Length			Maturity	Paired otoliths	Stomachs examined	Remarks
		M	F	T				
1	155	18	13	31	31		31	T.C.
2	120	58	27	85	85		85	T.C.
4	149	36	41	77	77		77	T.C.
7	146	7	4	11	11		11	T.C.
8	117	66	22	88	88		88	T.C.
9	84	8	0	8	8		8	T.C.
10	89	4	4	8	8		8	T.C.
11	185	12	5	17	17		17	T.C.
12	150	6	1	7	7		7	T.C.
13	101	1	3	4	4		4	T.C.
14	198	50	23	73	73	73	73	Random
15	148	35	37	72	72	72	72	Random
16	148	1	3	4	4		4	T.C.
17	63	2	0	2	2		2	T.C.
28	132	4	9	13	13		13	T.C.
Total		308	192	500	500	145	500	

[a]Sets 1-17 are bottom trawl samples and set 28 is a midwater trawl sample.

Table 14. Sablefish maturity frequency. F/V CALEDONIAN, August 19-29,1987.

Set no.	1			2			4			7		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	2	4	6	31	14	45	12	5	17	3	1	4
R1	15	2	17	25	11	36	21	6	27	3	0	3
R2	1	7	8	2	2	4	3	30	33	1	3	4
R	-	-	-	-	-	-	-	-	-	-	-	-
1R	-	-	-	-	-	-	-	-	-	-	-	-
2R	-	-	-	-	-	-	-	-	-	-	-	-
RR	-	-	-	-	-	-	-	-	-	-	-	-
S	-	-	-	-	-	-	-	-	-	-	-	-
Rb	-	-	-	-	-	-	-	-	-	-	-	-
Rc	-	-	-	-	-	-	-	-	-	-	-	-
Rt	-	-	-	-	-	-	-	-	-	-	-	-
Total	18	13	31	58	27	85	36	41	77	7	4	11

Set no.	8			9			10			11		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	42	13	55	8	-	8	4	4	8	5	5	10
R1	24	6	30	-	-	-	-	-	-	7	-	7
R2	-	3	3	-	-	-	-	-	-	-	-	-
R	-	-	-	-	-	-	-	-	-	-	-	-
1R	-	-	-	-	-	-	-	-	-	-	-	-
2R	-	-	-	-	-	-	-	-	-	-	-	-
RR	-	-	-	-	-	-	-	-	-	-	-	-
S	-	-	-	-	-	-	-	-	-	-	-	-
Rb	-	-	-	-	-	-	-	-	-	-	-	-
Rc	-	-	-	-	-	-	-	-	-	-	-	-
Rt	-	-	-	-	-	-	-	-	-	-	-	-
Total	66	22	88	8	0	8	4	4	8	12	5	17

Table 14 (cont'd)

Set no.	12			13			14			15		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	1	-	1	1	3	4	19	17	36	1	9	10
R1	4	1	5	-	-	-	13	6	19	6	13	19
R2	0	-	0	-	-	-	0	-	0	1	0	1
R	0	-	0	-	-	-	0	-	0	0	0	0
1R	0	-	0	-	-	-	0	-	0	0	0	0
2R	0	-	0	-	-	-	0	-	0	0	0	0
RR	0	-	0	-	-	-	0	-	0	0	0	0
S	0	-	0	-	-	-	0	-	0	0	0	0
Rb	0	-	0	-	-	-	0	-	0	0	0	0
Rc	0	-	0	-	-	-	0	-	0	0	0	0
Rt	1	-	1	-	-	-	18	-	18	27	15	42
Total	6	1	7	1	3	4	50	23	73	35	37	72

Set no.	16			17			28			Total		
Gonad maturity stage	M	F	T	M	F	T	M	F	T	M	F	T
I2	-	-	-	-	-	-	2	7	9	131	82	213
R1	-	1	1	-	-	-	1	0	1	119	46	165
R2	-	0	0	-	-	-	0	0	0	8	45	53
R	-	0	0	-	-	-	0	0	0	0	0	0
1R	-	0	0	-	-	-	0	0	0	0	0	0
2R	-	0	0	-	-	-	0	0	0	0	0	0
RR	-	0	0	-	-	-	0	0	0	0	0	0
S	-	0	0	-	-	-	0	0	0	0	0	0
Rb	-	0	0	-	-	-	0	0	0	0	0	0
Rc	-	0	0	-	-	-	0	0	0	0	0	0
Rt	1	2	3	2	-	2	1	2	3	50	19	69
Total	1	3	4	2	0	2	4	9	13	308	192	500

Table 15. Sablefish stomach contents by size category of sablefish in the La Pérouse Bank survey area, August 1987.

	Size category (cm)						
	30-39	40-49	50-59	60-69	70-79	80-89	Total
Stomachs examined	18	94	173	148	64	4	501
Stomachs empty	2	18	28	22	8	1	79
Stomachs everted	-	-	-	1	-	-	1
Stomach contents	16	76	145	125	56	3	421
Diet-volume (cc)							
Pacific herring		920 (6)[a]	4045(28)	1120 (7)	300 (1)		6385 (42)
Pacific hake		150	325	780	650		1905 (15)
Hake heads only			705	7490	7240	1100	16535 (80)
Spiny dogfish				120		200	320 (3)
Salmonidae						200	200 (1)
Myctophidae		10		5			15 (2)
Eulachon					10		10 (1)
Rockfish heads only				120			120 (1)
Fish remains (unid.)		540	777	2765	1610		5692 (99)
Unid. remains	34	72	165	100	40		411 (23)
Euphausiid	337	1630	4907	1780	489		9143(171)
Pink shrimp			5	15	50		70 (7)
Jellyfish	16	522	1123	2025	475		4161 (58)
Squat lobster			3				3 (1)
Stones				1			1 (1)
Total (cc)	387	3844	12055	16321	10864	1500	44971 cc

[a]Frequency of sablefish stomachs in brackets.

Table 16. Summary of spiny dogfish sampled. F/V CALEDONIAN, August 19-29, 1987.

Set[a] no.	Average net depth (m)	Length			Stomachs examined	Remarks
		M	F	T		
1	155	9	8	17	17	T.C.
7	146	15	7	22	22	T.C.
8	117	43	56	99	99	T.C.
9	84	49	27	77	77	T.C.
10	89	5	4	9	9	T.C.
11	185	9	8	17	17	T.C.
12	150	65	23	89	89	T.C.
15	148	9	3	12	-	T.C.
16	148	37	25	62	-	T.C.
24	64	78	10	88	88	T.C.
25	59	41	58	99	-	T.C.
34	55	80	18	98	44	T.C.
Total		440	247	689	462	

[a]Sets 1-16 are bottom trawl samples and 24-34 are midwater trawl samples.

Table 17. Spiny dogfish stomach contents by size category of dogfish in the La Pérouse Bank survey area, August 1987.

	Size category (cm)			
	<60	60-80	>80	Total
Stomachs examined	35	313	114	462
Stomachs empty	20	148	49	217
Stomach contents	15	165	65	245
Diet-volume (cc)				
Pacific herring	3 (1)	495 (9)	1347(22)	1845 (32)[a]
Pacific hake	40	608	1652	2300 (33)
Hake heads only			60	60 (1)
Salmonidae			270	270 (4)
Fish remains (unid.)	45	707	425	1177 (31)
Unid. remains		130	30	160 (8)
Euphausiid	269	6816	1466	8551(171)
Jellyfish			40	40 (1)
Turkey feet		1	1	2 (2)
Total (cc)	357	8757	5291	14405 cc

[a]Frequency of dogfish stomachs in brackets.

Table 18. Age composition, mean standard length (mm) and mean body weight-at-age (g) for herring collected during the August 19-29, 1987 La Pérouse survey ($\bar{x} \pm \bar{s}x$). Scales were not collected from fish with age given as unknown.

Parameter	Set no.	Age 1+	2+	3+	4+	5+	6+	7+ and older	Unknown
					40-Mile Bank				
Length	18	151± 9.6	190±12.3	205± 6.3	216±12.0	222±10.4	216	246± 9.9	223±32
Weight		45±12.9	85±19.0	106±10.6	125±19.7	140±14.7	134	180±34	90±51
n		3	22	11	34	12	1	2	120
Length	30	-	194±10.4	207± 9.6	214±10.4	221± 8.3	227± 7.5	241	207±14.7
Weight		-	104±18.7	120±17.7	133±18.3	155±21.4	151±14.0	213	121±26.3
n		0	20	37	43	16	3	1	77
Length	34	-	183± 6.4	202±10.0	208± 8.0	214± 3.7	-	244± 7.8	206±14.8
Weight		-	84±10.6	119±18.1	126±16.4	141± 9.4	-	229± 8.5	110±27.7
n		0	33	10	20	4	0	2	130
Length	36	-	186± 8.5	204±11.1	213± 6.3	221± 3.5	219	217	200±15.8
Weight		-	89±15.4	110±14.5	134±14.5	158± 7.8	139	127	102±26.7
n		0	48	8	9	2	1	1	134
Length	39	-	-	-	-	-	-	-	223± 9.6
Weight		-	-	-	-	-	-	-	-
n		0	0	0	0	0	0	0	100

Table 18 (cont'd)

Parameter	Set no.	Age 1+	2+	3+	4+	5+	6+	>6+	Unknown
					Finger Bank				
Length	10[a]	173± 8.7	185± 8.2	197±15.1	210	-	-	-	169±11.1
Weight		67±12.3	83±13.5	103±21.1	124	-	-	-	60±13.8
n		65	20	5	1	0	0	0	9
Length	11[a]	174± 9.7	191± 8.1	205±11.5	216±11.6	-	-	248± 2.1	184±10.0
Weight		69±11.6	96±13.0	122±19.9	139±40	-	-	208±19.1	85±14.4
n		17	35	16	4	0	0	2	12
					Firing Range				
Length	20	151± 7.6	180±12.0	193±18.4	211	-	-	-	143±39
Weight		41± 7.4	71±14.0	83±22.7	118	-	-	-	42±29.6
n		59	23	3	1	0	0	0	19
					Swiftsure Bank				
Length	24	153± 7.7	171±15.1	193±10.5	203±19.2	214±21.2	245	-	170±24.4
Weight		46± 7.0	67±17.7	108±18.8	178	156	197	-	94±33
n		78	56	7	4	2	1	0	69
					South Slope				
Length	26	145± 4.8	175± 9.3	204± 9.2	202	-	-	-	171±16.8
Weight		41± 4.5	75±13.7	118± 9.9	123	-	-	-	65±21.7
n		18	40	2	1	0	0	0	118
Length	28	168±15.9	188± 8.1	201± 9.6	211±10.8	216±11.6	223	241	197±15.8
Weight		56±17.8	93±15.9	113±19.0	135±21.8	160±19.9	147	202	106±28.8
n		3	85	14	8	6	1	1	83

[a]Collected in bottom tows.

Table 19. Herring length frequency, F/V CALEDONIAN, August 19-29, 1987.

Standard length (mm)	Firing Range	Swift-sure	Finger Bank	South slope[a]	40 Mile Bank				
					Set				
	set 20	set 24	set 26	set 28	18	30	34	36	39
120									
125									
130									
135	3								
140	8	3	1						
145	17	6	7						
150	18	14	9			1			
155	12	20	11	1		0			
160	8	14	8	1	1	0			
165	0	14	5	0	0	0		1	
170	5	6	10	1	1	0		0	
175	8	3	13	6	0	1		3	
180	9	3	17	10	0	2	3	8	
185	3	2	6	8	0	1	7	14	
190	2	4	10	11	3	3	9	14	
195	1	4	0	22	1	5	9	10	
200	3	1	1	12	2	11	13	14	4
205	2	1	0	11	1	11	11	11	3
210	1	1	1	7	5	19	11	5	14
215		0	1	2	3	13	17	7	15
220		1		5	8	17	8	7	16
225		2		3	7	7	6	3	23
230		0		0	16	4	2	3	16
235		0		1	9	3	1	1	4
240		0		2	11	2	2	0	3
245		1			8		1	1	2
250					2				
255					6				
260									

[a]South slope area commonly referred to as the Rathole.

Table 20. Summary of other species sampled. F/V CALEDONIAN, August 19-29, 1987.

Set no.	Average net depth (m)	Length M	Length F	Length T	Stomachs examined	Maturity	Fins	Remarks
				Walleye pollock				
1	155	16	123	139	139	139	139	Random
23	95	103	88	191	-	-	-	Random
Total		119	211	330	139	139	139	
				Lingcod				
14[a]	198	0	2	2	2	2		T.C.
17[a]	63	2	1	3	3	3		T.C.
18[a]		21	16	37	37	37		T.C.
Total		23	19	42	42	42		
				Halibut				
18[a]	64	7	15	23	8	12		T.C.
Total		7	15	23	8	12		
				Redstripe rockfish				
28[a]	132	2	8	10				Selected
Total		2	8	10				

[a]Fish sampled for electrophoretic analysis.

Table 20 (cont'd)

Set no.	Average net depth (m)	Length M	Length F	Length T	Stomachs examined	Maturity	Fins	Remarks
				Herring				
12	150	-	-	15	-	-	-	Regurgitated from lingcod stomachs
Total				15				
				Chinook salmon				
24	64	3	2	5	5	-	-	T.C.
25	59	2	1	3	3	-	-	T.C.
30	64	4	5	9	9	-	-	T.C.
34	55	2	8	10	10	-	-	T.C.
Total		11	16	27	27			

Table 21. Stomach contents of other species in the La Pérouse Bank survey area, August 1987.

	Predator			
	Walleye pollock	Chinook salmon	Lingcod	Halibut
Stomachs examined	140	27	42	8
Stomachs empty	3	12	10	-
Stomachs everted	-	-	1	-
Stomach contents	137	15	31	8
Diet-volume (cc)				
Pacific herring		714(10)[a]	4846(15)[a]	800(3)[a]
Pacific hake			500	
Pacific sand lance			860	80
Salmonidae				999
Poacher (sp.)				60
Fish remains (unid.)	10		80	600
Unid. remains	71			
Euphausiid	890	83		
Pink shrimp	177			
Turkey feet		30		
Total (cc)	1148	827	6286	2539

[a]Frequency of predator stomachs in brackets.

APPENDIX TABLE 1. OFFSHORE HAKE BIOLOGICAL CRUISE, F/V CALEDONIAN, AUGUST 19-29,1987.
(SEE FOOTNOTES APPENDIX TABLE 1)

HAUL NUMBER		1	2	3	4
DATE		AUG 19	AUG 19	AUG 19	AUG 19
AREA (MAJOR, MINOR)		3C,23	3C,23	3C,23	3C,23
START TIME	PST)	13:32	16:42	17:45	19:56
DURATION	(MIN)	33	30	30	31
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	36.7	32.9	31.1	34.5
W. LONG	(DEG)	125	125	125	125
	(MIN)	31.1	33.4	35.3	23.6
FINISH N. LAT.	(DEG)	..	48	48	48
	(MIN)	..	31.3	31.9	33.3
W. LONG	(DEG)	100	125	125	125
	(MIN)	..	33.4	38.1	21.9
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	155- 155	124- 117	88- 80	134- 163
	(FM)	85- 85	68- 64	48- 44	73- 89
MODAL DEPTH	(M)	155	120	..	..
NET/GEAR DEPTH	(M)	..- ..	..- ..	..- ..	..- ..
	(FM)	..- ..	..- ..	..- ..	..- ..
MODAL NET DEPTH	(M)	..	..	..	..
GEAR TYPE		100	100	100	100
TOTAL CATCH	(KG)	603	802	78	341
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	1	2	3	4
DATE	AUG 19	AUG 19	AUG 19	AUG 19
AREA (MAJOR, MINOR)	3C,23	3C,23	3C,23	3C,23
ARROWTOOTH FLOUNDER	136	45	2	5
DOVER SOLE	7	..	..	18
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	18
PACIFIC HALIBUT	..	..	..	7
REX SOLE	5	..	..	10
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	1	..	..	..
S. ALUTUS	..	..	..	..
S. BABCOCKI	..	..	..	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	1	..	..	..
S. ELONGATUS	..	1	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	..	..	..
S. PINNIGER	..	..	..	..
S. PRORIGER	..	..	..	..
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	..	..	..
EULACHON	..	..	..	..
LINGCOD	..	..	3	7
PACIFIC COD	..	18	7	9
PACIFIC HAKE	102	364	7	5
PACIFIC HERRING	..	..	..	1
SABLEFISH	57	364	5	250
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	249	5	..	4
RATFISH	11	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	34	5	54	5
PRAWN	..	..	..	..
PINK SHRIMP	T	T	T	2
TOTAL CATCH (KG)	603	802	78	341

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		5	6	7	8
DATE		AUG 20	AUG 20	AUG 20	AUG 20
AREA (MAJOR, MINOR)		3C,21	3C,21	3C,21	3C,23
START TIME	PST)	8:31	9:57	11:15	13:17
DURATION	(MIN)	17	40	32	30
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	28.7	28.5	27.9	32.1
W. LONG	(DEG)	125	125	125	125
	(MIN)	4.4	5.6	9.9	22.7
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	28.3	26.9	28.7	30.5
W. LONG	(DEG)	125	125	125	125
	(MIN)	5.6	7.9	10.3	24.3
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	159- 176	172- 170	143- 148	121- 113
	(FM)	87- 96	94- 93	78- 81	66- 62
MODAL DEPTH	(M)	..	..	..	..
NET/GEAR DEPTH	(M)	..- ..	..- ..	..- ..	..- ..
	(FM)	..- ..	..- ..	..- ..	..- ..
MODAL NET DEPTH	(M)	..	..	..	..
GEAR TYPE		100	100	100	100
TOTAL CATCH	(KG)	0	115	608	3292
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	5	6	7	8
DATE	AUG 20	AUG 20	AUG 20	AUG 20
AREA (MAJOR, MINOR)	3C,21	3C,21	3C,21	3C,23
ARROWTOOTH FLOUNDER	..	..	39	114
DOVER SOLE	..	..	5	..
ENGLISH SOLE	..	..	..	10
FLATHEAD SOLE	..	..	5	..
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	..	..	..
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	5	7	..
S. BABCOCKI	..	7	2	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	..	2	..	..
S. ELONGATUS	..	1	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	2	23
S. PAUCISPINIS	..	..	..	..
S. PINNIGER	..	..	..	159
S. PRORIGER	..	..	..	..
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	5	..	..
CHINOOK SALMON	..	..	..	..
EULACHON	..	..	..	..
LINGCOD	..	..	..	7
PACIFIC COD	..	7	..	10
PACIFIC HAKE	..	10	455	..
PACIFIC HERRING	..	..	..	..
SABLEFISH	..	46	36	455
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	..	9	10	9
RATFISH	..	2	..	5
SKATES	..	..	..	..
SPINY DOGFISH	..	21	..	2500
PRAWN	..	..	1	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	0	115	608	3292

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		9	10	11	12
DATE		AUG 20	AUG 20	AUG 21	AUG 21
AREA (MAJOR, MINOR)		3C,23	3C,23	3C,21	3C,23
START TIME	PST)	16:20	18:49	11:37	14:07
DURATION	(MIN)	30	31	33	32
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	39.7	52.3	16.6	27.2
W. LONG	(DEG)	128	125	125	125
	(MIN)	45.1	46.2	48.5	55.3
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	40.9	54.1	18.2	27.9
W. LONG	(DEG)	125	125	125	125
	(MIN)	46.8	46.7	49.7	57.7
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	60- 102	97- 86	190- 181	152- 148
	(FM)	33- 56	53- 47	104- 99	83- 81
MODAL DEPTH	(M)	..	..	..	..
NET/GEAR DEPTH	(M)	..- ..	..- ..	..- ..	..- ..
	(FM)	..- ..	..- ..	..- ..	..- ..
MODAL NET DEPTH	(M)	..	..	..	..
GEAR TYPE		100	100	100	100
TOTAL CATCH	(KG)	1904	519	2105	1779
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	9	10	11	12
DATE	AUG 20	AUG 20	AUG 21	AUG 21
AREA (MAJOR, MINOR)	3C,23	3C,23	3C,21	3C,23
ARROWTOOTH FLOUNDER	18	5	18	7
DOVER SOLE	..	6	..	2
ENGLISH SOLE	..	5	7	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	5	..	..
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	..	46	..
S. BABCOCKI	..	..	..	5
S. BREVISPINIS	..	..	80	34
S. CRAMERI	5	..	..	..
S. ELONGATUS	5	..	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	..	18	..
S. PINNIGER	5	..	91	682
S. PRORIGER	46	..	1700	136
S. REEDI	..	..	68	..
S. RUBERRIMUS	..	..	..	9
S. ZACENTRUS	..	..	..	46
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	..	..	..
EULACHON	..	..	..	..
LINGCOD	36	..	6	10
PACIFIC COD	227	5	2	3
PACIFIC HAKE	..	455	14	..
PACIFIC HERRING	..	..	..	..
SABLEFISH	57	4	32	18
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	..	..	..	..
RATFISH	455	7	..	9
SKATES	..	..	..	..
SPINY DOGFISH	1050	27	23	818
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	1904	519	2105	1779

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		13	14	15	16
DATE		AUG 21	AUG 22	AUG 22	AUG 22
AREA (MAJOR, MINOR)		3C,23	3C,21	3C,23	3C,23
START TIME	PST)	16:56	6:30	10:13	13:41
DURATION	(MIN)	43	55	32	39
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	41.3	17.1	27.6	34.6
W. LONG	(DEG)	125	125	125	125
	(MIN)	4.6	49.0	27.8	22.8
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	43.5	19.1	28.9	35.0
W. LONG	(DEG)	126	125	125	125
	(MIN)	5.8	52.1	25.9	25.6
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	101- 101	209- 187	150- 146	155- 141
	(FM)	55- 55	114- 102	82- 80	85- 77
MODAL DEPTH	(M)	..	..	..	..
NET/GEAR DEPTH	(M)	..- ..	..- ..	..- ..	..- ..
	(FM)	..- ..	..- ..	..- ..	..- ..
MODAL NET DEPTH	(M)	..	..	..	..
GEAR TYPE		100	100	100	100
TOTAL CATCH	(KG)	121	3715	409	423
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	13	14	15	16
DATE	AUG 21	AUG 22	AUG 22	AUG 22
AREA (MAJOR, MINOR)	3C,23	3C,21	3C,23	3C,23
ARROWTOOTH FLOUNDER	34	68	57	34
DOVER SOLE	5	..	3	16
ENGLISH SOLE	1	20	7	7
FLATHEAD SOLE	..	..	..	9
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	..	..	27
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	682	3	..
S. BABCOCKI	..	34	..	..
S. BREVISPINIS	3	205	5	..
S. CRAMERI	..	..	1	..
S. ELONGATUS	..	18	1	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	455	..	..
S. PINNIGER	7	114	..	..
S. PRORIGER	..	1705	14	..
S. REEDI	..	80	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	136	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	..	..	..
EULACHON	9	..	..	..
LINGCOD	10	16	..	..
PACIFIC COD	3	..	..	4
PACIFIC HAKE	27	..	45	23
PACIFIC HERRING	..	..	..	..
SABLEFISH	1	182	250	20
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	9	..	5	5
RATFISH	5	..	..	5
SKATES	..	..	..	..
SPINY DOGFISH	7	..	18	273
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	121	3715	409	423

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		17	18	19	20
DATE		AUG 22	AUG 22	AUG 23	AUG 23
AREA (MAJOR, MINOR)		3C,23	3C,23	3C,23	3C,23
START TIME	PST)	15:45	16:44	9:39	15:40
DURATION	(MIN)	17	56	27	44
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	33.6	34.0	52.7	54.1
W. LONG	(DEG)	125	125	125	125
	(MIN)	36.2	37.7	8.0	35.4
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	34.1	33.9	53.6	54.6
W. LONG	(DEG)	125	125	125	125
	(MIN)	37.5	36.3	5.1	37.9
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	64- 62	62- 66	145- 146	95- 93
	(FM)	35- 34	34- 36	79- 80	52- 51
MODAL DEPTH	(M)	..	..	145	94
NET/GEAR DEPTH	(M)	..- ..	..- ..	82- 86	64- 64
	(FM)	..- ..	..- ..	45- 47	35- 35
MODAL NET DEPTH	(M)	..	..	84	64
GEAR TYPE		100	100	200	200
TOTAL CATCH	(KG)	88	518	5896	7
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	17	18	19	20
DATE	AUG 22	AUG 22	AUG 23	AUG 23
AREA (MAJOR, MINOR)	3C,23	3C,23	3C,23	3C,23
ARROWTOOTH FLOUNDER	9	2	..	..
DOVER SOLE	..	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	3	..	..	..
PACIFIC HALIBUT	..	91	..	..
REX SOLE	5	1	..	..
ROCK SOLE	..	1	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	..	..	..
S. BABCOCKI	..	..	..	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	..	..	..	..
S. ELONGATUS	..	..	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	..	..	..
S. PINNIGER	..	..	..	..
S. PRORIGER	..	..	..	..
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	..	..	5
EULACHON	..	..	..	1
LINGCOD	30	205	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	27	..	5851	..
PACIFIC HERRING	..	159	..	1
SABLEFISH	5	5	..	..
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	..	..	45	..
RATFISH	2	..	..	..
SKATES	..	9	..	..
SPINY DOGFISH	7	45	..	..
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	88	518	5896	7

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		21	22	23	24
DATE		AUG 23	AUG 24	AUG 24	AUG 25
AREA (MAJOR, MINOR)		3C,23	3C,25	3C,23	3C,21
START TIME	PST)	18:26	12:50	15:57	9:30
DURATION	(MIN)	20	20	11	16
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	54.7	43.2	36.4	33.6
W. LONG	(DEG)	125	125	125	125
	(MIN)	46.5	42.0	27.7	4.3
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	54.7	43.9	36.3	33.6
W. LONG	(DEG)	125	125	125	125
	(MIN)	45.9	41.1	28.3	5.5
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	91- 104	173- 173	155- 177	102- 110
	(FM)	50- 57	95- 95	85- 97	56- 60
MODAL DEPTH	(M)	..	173	..	..
NET/GEAR DEPTH	(M)	55- 60	82- 82	95- 95	64- 64
	(FM)	30- 33	45- 45	52- 52	35- 35
MODAL NET DEPTH	(M)	57	82	95	64
GEAR TYPE		200	200	200	200
TOTAL CATCH	(KG)	3175	2727	7529	1122
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	21	22	23	24
DATE	AUG 23	AUG 24	AUG 24	AUG 25
AREA (MAJOR, MINOR)	3C,23	3C,25	3C,23	3C,21
ARROWTOOTH FLOUNDER	..	..	..	..
DOVER SOLE	..	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	..	..	..
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	..	..	..
S. BABCOCKI	..	..	..	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	..	..	..	..
S. ELONGATUS	..	..	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	..	45	..
S. PINNIGER	..	..	..	..
S. PRORIGER	..	..	..	..
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	..	..	34
EULACHON	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	3175	2722	6804	..
PACIFIC HERRING	..	..	..	907
SABLEFISH	..	..	..	..
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	..	..	680	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	5	..	181
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	3175	2727	7529	1122

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		25	26	27	28
DATE		AUG 25	AUG 25	AUG 25	AUG 26
AREA (MAJOR, MINOR)		3C,21	3C,23	3C,21	3C,21
START TIME	PST)	12:55	17:37	20:25	7:17
DURATION	(MIN)	28	27	30	39
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	29.6	21.9	20.3	21.1
W. LONG	(DEG)	125	125	125	125
	(MIN)	0.6	40.9	49.7	46.9
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	29.8	21.6	20.9	20.5
W. LONG	(DEG)	125	125	125	125
	(MIN)	0.4	41.1	47.5	49.0
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	99- 95	146- 146	154- 154	152- 165
	(FM)	54- 52	80- 80	84- 84	83- 90
MODAL DEPTH	(M)	..	..	..	..
NET/GEAR DEPTH	(M)	59- 59	110- 110	..- ..	128- 137
	(FM)	32- 32	60- 60	..- ..	70- 75
MODAL NET DEPTH	(M)	590	110	..	132
GEAR TYPE		200	200	200	200
TOTAL CATCH	(KG)	698	14	100	209
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	25	26	27	28
DATE	AUG 25	AUG 25	AUG 25	AUG 26
AREA (MAJOR, MINOR)	3C,21	3C,23	3C,21	3C,21
ARROWTOOTH FLOUNDER	9	..	..	..
DOVER SOLE	..	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	..	..	..
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	..	..	..
S. BABCOCKI	..	..	..	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	..	..	..	..
S. ELONGATUS	..	..	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	..	1
S. PAUCISPINIS	..	..	..	..
S. PINNIGER	..	..	..	..
S. PRORIGER	..	..	..	41
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	9	..	..	..
EULACHON	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	..	..	..
PACIFIC HERRING	..	14	9	91
SABLEFISH	..	..	..	45
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	..	..	..	4
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	680	..	91	27
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	698	14	100	209

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		29	30	31	32
DATE		AUG 26	AUG 26	AUG 26	AUG 26
AREA (MAJOR, MINOR)		3C,23	3C,23	3C,23	3C,23
START TIME	PST)	10:49	14:47	17:30	19:04
DURATION	(MIN)	7	16	44	10
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	28.3	34.0	34.2	31.4
W. LONG	(DEG)	125	125	125	125
	(MIN)	25.5	38.3	24.0	22.7
FINISH N. LAT.	(DEG)	48	..	48	48
	(MIN)	28.7	..	32.8	30.8
W. LONG	(DEG)	125	100	125	125
	(MIN)	26.0	..	21.9	23.3
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	155- 155	..- ..	88- 150	119- 132
	(FM)	85- 85	..- ..	48- 82	65- 72
MODAL DEPTH	(M)	..	..	..	..
NET/GEAR DEPTH	(M)	110- 110	64- ..	..- ..	91- 97
	(FM)	60- 60	35- ..	..- ..	50- 53
MODAL NET DEPTH	(M)	..	..	..	..
GEAR TYPE		200	200	200	200
TOTAL CATCH	(KG)	9231	7419	22	408
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	29	30	31	32
DATE	AUG 26	AUG 26	AUG 26	AUG 26
AREA (MAJOR, MINOR)	3C,23	3C,23	3C,23	3C,23
ARROWTOOTH FLOUNDER	..	..	..	..
DOVER SOLE	..	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	..	..	..
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	..	..	..
S. BABCOCKI	..	..	..	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	..	..	..	..
S. ELONGATUS	..	..	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	..	..	..
S. PINNIGER	..	..	..	..
S. PRORIGER	..	..	..	..
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	23	4	..
EULACHON	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	9072	..	..	..
PACIFIC HERRING	..	7258	..	..
SABLEFISH	..	..	..	..
SOCKEYE SALMON	..	2	..	..
WALLEYE POLLOCK	91	..	..	363
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	68	136	18	..
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	9231	7419	22	408

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		33	34	35	36
DATE		AUG 27	AUG 27	AUG 28	AUG 28
AREA (MAJOR, MINOR)		3C,23	3C,23	3C,23	3C,23
START TIME	PST)	10:48	16:18	6:56	8:30
DURATION	(MIN)	17	36	29	5
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	28.4	33.7	34.4	33.4
W. LONG	(DEG)	125	125	125	125
	(MIN)	16.4	36.5	35.2	37.3
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	28.5	34.2	35.1	33.5
W. LONG	(DEG)	125	125	125	125
	(MIN)	15.3	35.3	33.9	37.3
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	141- 154	66- 66	117- 126	70- 71
	(FM)	77- 84	36- 36	64- 69	38- 39
MODAL DEPTH	(M)	..	..	..	70
NET/GEAR DEPTH	(M)	..- ..	55- 55	73- 81	13- 14
	(FM)	..- ..	30- 30	40- 44	7- 8
MODAL NET DEPTH	(M)	..	66	..	..
GEAR TYPE		200	200	200	200
TOTAL CATCH	(KG)	957	360	1593	354
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	33	34	35	36
DATE	AUG 27	AUG 27	AUG 28	AUG 28
AREA (MAJOR, MINOR)	3C,23	3C,23	3C,23	3C,23
ARROWTOOTH FLOUNDER	1	..	..	..
DOVER SOLE	..	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	..	..	..
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	..	..	..
S. BABCOCKI	..	..	..	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	..	..	..	..
S. ELONGATUS	..	..	..	..
S. ENTOMELAS	4	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	..	..	..
S. PINNIGER	..	..	..	..
S. PRORIGER	..	..	1	..
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	32	5	14
EULACHON	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	771	..	1542	27
PACIFIC HERRING	..	55	..	18
SABLEFISH	..	..	..	..
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	136	..	27	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	45	273	18	295
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	957	360	1593	354

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER		37	38	39	40
DATE		AUG 28	AUG 28	AUG 29	AUG 29
AREA (MAJOR, MINOR)		3C,23	3C,23	3C,23	3C,23
START TIME	PST)	11:20	15:20	7:03	8:58
DURATION	(MIN)	29	26	22	27
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	35.0	35.5	33.3	36.0
W. LONG	(DEG)	125	125	125	125
	(MIN)	34.5	34.2	36.9	35.0
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	35.9	35.9	34.1	36.7
W. LONG	(DEG)	125	125	125	125
	(MIN)	33.3	33.0	36.1	34.0
HAUL DISTANCE	(KM)	0.0	0.0	0.0	0.0
	(N MI)	0.0	0.0	0.0	0.0
DIRECTION (DEG.TRUE)		0	0	0	0
BOTTOM DEPTH	(M)	128- 132	128- 110	64- 64	128- 128
	(FM)	70- 72	70- 60	35- 35	70- 70
MODAL DEPTH	(M)	..	..	64	128
NET/GEAR DEPTH	(M)	101- 104	..- ..	..- ..	106- 106
	(FM)	55- 57	..- ..	..- ..	58- 58
MODAL NET DEPTH	(M)	..	..	..	106
GEAR TYPE		200	200	200	200
TOTAL CATCH	(KG)	2636	3629	1452	1815
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONT'D)

HAUL NUMBER	37	38	39	40
DATE	AUG 28	AUG 28	AUG 29	AUG 29
AREA (MAJOR, MINOR)	3C,23	3C,23	3C,23	3C,23
ARROWTOOTH FLOUNDER	..	..	..	..
DOVER SOLE	..	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
REX SOLE	..	..	..	..
ROCK SOLE	..	..	..	..
S. ALEUTIANUS	..	..	..	..
S. ALUTUS	..	..	..	..
S. BABCOCKI	..	..	..	..
S. BREVISPINIS	..	..	..	..
S. CRAMERI	..	..	..	..
S. ELONGATUS	..	..	..	..
S. ENTOMELAS	..	..	..	..
S. FLAVIDUS	5	..	..	..
S. PAUCISPINIS	..	..	14	..
S. PINNIGER	..	..	..	..
S. PRORIGER	..	..	..	..
S. REEDI	..	..	..	..
S. RUBERRIMUS	..	..	..	..
S. ZACENTRUS	..	..	..	..
SEB. ALASCANUS	..	..	..	..
CHINOOK SALMON	..	..	..	..
EULACHON	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	2155	3493	9	1588
PACIFIC HERRING	..	..	1361	..
SABLEFISH	..	..	..	..
SOCKEYE SALMON	..	..	..	..
WALLEYE POLLOCK	113	11	..	204
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	363	125	68	23
PRAWN	..	..	..	..
PINK SHRIMP	..	..	..	..
TOTAL CATCH (KG)	2636	3629	1452	1815

APPENDIX TABLE 2. OFFSHORE HAKE BIOLOGICAL CRUISE, R/V W.E. RICKER, AUGUST 15-31,1987.
(SEE FOOTNOTES APPENDIX TABLE 2)

HAUL NUMBER		1	2	3	4
DATE		AUG 25	AUG 26	AUG 26	AUG 27
AREA (MAJOR, MINOR)		3D,27	3D,27	3D,25	3D,25
START TIME	PST)	18:43	9:21	15:17	9:40
DURATION	(MIN)	8	60	30	90
START N. LAT.	(DEG)	50	50	49	48
	(MIN)	42.1	18.9	44.8	59.7
W. LONG	(DEG)	129	128	127	126
	(MIN)	2.8	17.2	34.7	40.3
FINISH N. LAT.	(DEG)	50	50	49	49
	(MIN)	43.0	16.4	44.8	3.5
W. LONG	(DEG)	129	128	127	126
	(MIN)	9.6	14.6	32.8	44.9
HAUL DISTANCE	(KM)	8.3	5.2	2.4	9.1
	(N MI)	4.5	2.8	1.3	4.9
DIRECTION (DEG.TRUE)		283	145	90	321
BOTTOM DEPTH	(M)	425- 416	211- 700	430- 216	214- 177
	(FM)	232- 227	115- 383	235- 118	117- 97
MODAL DEPTH	(M)	420	500	320	196
NET/GEAR DEPTH	(M)	100- 100	100- 100	100- 100	100- 100
	(FM)	55- 55	55- 55	55- 55	55- 55
MODAL NET DEPTH	(M)	100	100	100	100
GEAR TYPE		222	222	222	222
TOTAL CATCH	(KG)	161	250	0	0
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONT'D)

HAUL NUMBER	1	2	3	4
DATE	AUG 25	AUG 26	AUG 26	AUG 27
AREA (MAJOR, MINOR)	3D,27	3D,27	3D,25	3D,25
S. ALUTUS	..	2	..	..
S. FLAVIDUS	1	..	..	..
AMERICAN SHAD	..	..	..	..
PACIFIC HAKE	159	248	..	..
WALLEYE POLLOCK	..	..	..	..
PACIFIC LAMPREY	1	..	..	..
SPINY DOGFISH	..	..	..	..
TOTAL CATCH (KG)	161	250	0	0

APPENDIX TABLE 2 (CONT'D)

HAUL NUMBER		5	6	7
DATE		AUG 27	AUG 28	AUG 29
AREA (MAJOR, MINOR)		3C,24	3C,23	3C,23
START TIME	PST)	13:32	17:32	13:44
DURATION	(MIN)	44	50	41
START N. LAT.	(DEG)	49	48	48
	(MIN)	2.6	36.3	36.3
W. LONG	(DEG)	126	125	125
	(MIN)	40.7	29.3	30.2
FINISH N. LAT.	(DEG)	49	48	48
	(MIN)	4.1	36.4	36.4
W. LONG	(DEG)	126	125	125
	(MIN)	43.1	33.6	33.9
HAUL DISTANCE	(KM)	3.9	5.4	4.4
	(N MI)	2.1	2.9	2.4
DIRECTION (DEG.TRUE)		315	284	272
BOTTOM DEPTH	(M)	161- 159	171- 134	188- 134
	(FM)	88- 87	94- 73	103- 73
MODAL DEPTH	(M)	160	151	161
NET/GEAR DEPTH	(M)	137- 100	102- 100	100- 100
	(FM)	75- 55	56- 55	55- 55
MODAL NET DEPTH	(M)	120	101	100
GEAR TYPE		222	222	222
TOTAL CATCH	(KG)	0	3092	909
REMARKS		USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONT'D)

HAUL NUMBER	5	6	7
DATE	AUG 27	AUG 28	AUG 29
AREA (MAJOR, MINOR)	3C,24	3C,23	3C,23
S. ALUTUS	..	..	..
S. FLAVIDUS	..	..	..
AMERICAN SHAD	..	1	..
PACIFIC HAKE	..	2727	682
WALLEYE POLLOCK	..	273	182
PACIFIC LAMPREY	..	..	..
SPINY DOGFISH	..	91	45
TOTAL CATCH (KG)	0	3092	909

Footnotes to Appendix Tables 1 and 2.

Area:	Major area	3C	Southwest Vancouver Island
	"	3D	Northwest Vancouver Island
	Minor area	21	Swiftsure Bank
	"	23	La Pérouse Bank
	"	24	Sidney Inlet
	"	25	Nootka Sound to Tahsis Inlet
	"	27	Quatsino Sound
PST:			Pacific Standard Time
Gear type:		110	Bottom trawl
		222	Midwater trawl
Total catch:			Total catch weight in kilograms

APPENDIX TABLE 3. PACIFIC HAKE LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	1			2			7			10		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	1	1
41	-	-	-	-	-	-	-	1	1	-	0	0
42	-	-	-	-	-	-	-	2	2	-	0	0
43	-	-	-	-	-	-	1	2	3	-	0	0
44	-	-	-	-	-	-	2	2	4	-	0	0
45	2	1	3	-	-	-	7	8	15	-	0	0
46	0	0	0	-	-	-	6	11	17	-	0	0
47	3	4	7	-	-	-	13	8	21	2	0	2
48	4	2	6	1	-	1	9	9	18	0	3	3
49	4	1	5	0	1	1	2	10	12	2	3	5
50	2	5	7	1	2	3	9	12	21	2	4	6
51	0	10	10	0	0	0	3	9	12	1	3	4
52	3	4	7	0	6	6	7	5	12	2	7	9
53	1	3	4	0	5	5	2	1	3	3	4	7
54	0	3	3	1	8	9	2	3	5	1	3	4
55	3	2	5	0	7	7	1	1	2	1	9	10
56	1	6	7	0	8	8	-	2	2	0	13	13
57	1	2	3	0	6	6	-	2	2	0	7	7
58	0	4	4	0	5	5	-	0	0	0	8	8
59	1	2	3	2	9	11	-	0	0	1	4	5
60	0	2	2	-	5	5	-	1	1	0	2	2
61	1	1	2	-	4	4	-	0	0	0	0	0
62	-	2	2	-	6	6	-	0	0	0	5	5
63	-	0	0	-	3	3	-	0	0	0	0	0
64	-	1	1	-	1	1	-	0	0	0	1	1
65	-	0	0	-	1	1	-	0	0	0	-	0

APPENDIX TABLE 3 (CONT'D)

SET NO.	1			2			7			10		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
66	-	0	0	-	2	2	-	0	0	0	-	0
67	-	0	0	-	2	2	-	1	1	1	-	1
68	-	2	2	-	1	1	-	-	-	-	-	-
69	-	1	1	-	2	2	-	-	-	-	-	-
70	-	1	1	-	2	2	-	-	-	-	-	-
71	-	0	0	-	-	-	-	-	-	-	-	-
72	-	0	0	-	-	-	-	-	-	-	-	-
73	-	1	1	-	-	-	-	-	-	-	-	-
74	-	-	-	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	26	60	86	5	86	91	64	90	154	16	77	93

APPENDIX TABLE 3 (CONT'D)

SET NO. FORK LENGTH (CM)	11			13			15			16		
	M	F	T	M	F	T	M	F	T	M	F	T
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	1	1
41	-	-	-	-	-	-	-	-	-	-	0	0
42	-	-	-	-	-	-	-	1	1	-	0	0
43	-	-	-	-	-	-	-	0	0	-	0	0
44	-	-	-	-	-	-	1	0	1	1	1	2
45	-	-	-	-	-	-	2	1	3	2	0	2
46	-	-	-	-	-	-	1	4	5	0	2	2
47	-	-	-	-	1	1	1	1	2	0	1	1
48	-	-	-	1	0	1	2	7	9	5	4	9
49	-	-	-	1	2	3	2	2	4	2	1	3
50	-	1	1	0	1	1	4	9	13	1	1	2
51	-	0	0	1	0	1	2	7	9	-	1	1
52	-	0	0	0	1	1	0	6	6	-	3	3
53	-	1	1	0	5	5	1	2	3	-	1	1
54	1	1	2	0	4	4	4	2	6	-	1	1
55	-	2	2	0	3	3	0	3	3	-	5	5
56	-	1	1	1	4	5	0	6	6	-	5	5
57	-	1	1	0	0	0	0	1	1	-	1	1
58	-	0	0	0	0	0	1	1	2	-	3	3
59	-	2	2	0	0	0	-	1	1	-	0	0
60	-	1	1	0	2	2	-	0	0	-	0	0
61	-	0	0	0	0	0	-	0	0	-	0	0
62	-	0	0	0	0	0	-	2	2	-	1	1
63	-	0	0	0	0	0	-	-	-	-	-	-
64	-	1	1	1	1	2	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX TABLE 3 (CONT'D)

SET NO.	11			13			15			16		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
66	-	-	-	-	-	-	-	-	-	-	-	-
67	-	-	-	-	-	-	-	-	-	-	-	-
68	-	-	-	-	-	-	-	-	-	-	-	-
69	-	-	-	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	-	-	-	-
71	-	-	-	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-	-	-
74	-	-	-	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	1	11	12	5	24	29	21	56	77	11	32	43

APPENDIX TABLE 3 (CONT'D)

SET NO. FORK LENGTH (CM)	17			19			21			22		
	M	F	T	M	F	T	M	F	T	M	F	T
23	-	-	-	-	1	1	-	-	-	-	-	-
24	-	-	-	-	0	0	-	-	-	-	-	-
25	-	-	-	-	0	0	-	-	-	-	-	-
26	-	-	-	1	0	1	-	-	-	-	-	-
27	-	-	-	0	0	0	-	-	-	-	-	-
28	-	-	-	0	0	0	-	-	-	-	-	-
29	-	-	-	0	0	0	-	-	-	-	-	-
30	-	-	-	0	0	0	-	-	-	-	-	-
31	-	-	-	0	0	0	-	-	-	-	-	-
32	-	-	-	1	0	1	-	-	-	-	-	-
33	-	-	-	2	1	3	-	-	-	-	-	-
34	-	-	-	7	2	9	-	-	-	-	-	-
35	-	-	-	25	4	29	-	-	-	-	-	-
36	-	-	-	24	10	34	-	-	-	-	-	-
37	-	-	-	17	26	43	1	-	1	-	-	-
38	-	-	-	16	20	36	0	-	0	-	-	-
39	-	-	-	5	16	21	0	-	0	-	-	-
40	-	-	-	1	10	11	2	1	3	3	-	3
41	-	-	-	0	3	3	1	2	3	2	-	2
42	-	-	-	1	5	6	0	0	0	0	1	1
43	-	-	-	-	1	1	1	0	1	2	0	2
44	-	-	-	-	1	1	0	2	2	4	3	7
45	-	-	-	-	-	-	1	1	2	10	6	16
46	1	1	2	-	-	-	1	3	4	6	9	15
47	0	2	2	-	-	-	2	2	4	10	21	31
48	1	0	1	-	-	-	6	6	12	18	17	35
49	0	3	3	-	-	-	9	10	19	15	20	35
50	2	2	4	-	-	-	4	14	18	12	14	26
51	2	1	3	-	-	-	14	12	26	15	17	32
52	0	1	1	-	-	-	10	13	23	10	10	20
53	0	0	0	-	-	-	7	19	26	11	15	26
54	1	0	1	-	-	-	7	16	23	5	4	9
55	0	1	1	-	-	-	6	14	20	0	7	7
56	0	0	0	-	-	-	3	10	13	3	11	14
57	0	0	0	-	-	-	1	3	4	2	5	7
58	0	0	0	-	-	-	2	6	8	0	2	2
59	1	0	1	-	-	-	1	3	4	0	2	2
60	-	1	1	-	-	-	1	2	3	0	1	1
61	-	1	1	-	-	-	0	0	0	1	-	1
62	-	1	1	-	-	-	1	1	2	-	-	-
63	-	1	1	-	-	-	-	0	0	-	-	-
64	-	1	1	-	-	-	-	0	0	-	-	-
65	-	0	0	-	-	-	-	0	0	-	-	-

APPENDIX TABLE 3 (CONT'D)

SET NO.	17			19			21			22		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
66	-	0	0	-	-	-	-	1	1	-	-	-
67	-	0	0	-	-	-	-	-	-	-	-	-
68	-	1	1	-	-	-	-	-	-	-	-	-
69	-	0	0	-	-	-	-	-	-	-	-	-
70	-	0	0	-	-	-	-	-	-	-	-	-
71	-	1	1	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-	-	-
74	-	-	-	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	8	18	26	100	100	200	81	141	222	129	165	294

APPENDIX TABLE 3 (CONT'D)

SET NO.	23			29			32			33		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	1	1	-	-	-	-	-	-
40	-	-	-	-	3	3	-	-	-	-	-	-
41	-	-	-	-	0	0	-	-	-	-	-	-
42	1	-	1	3	0	3	1	1	2	1	-	1
43	2	-	2	7	4	11	5	6	11	12	6	18
44	2	3	5	13	6	19	2	10	12	18	8	26
45	4	2	6	15	22	37	9	17	26	25	20	45
46	7	7	14	20	32	52	23	24	47	34	36	70
47	14	20	34	22	18	40	12	29	41	26	27	53
48	9	19	28	13	27	40	17	21	38	22	29	51
49	12	20	32	12	19	31	15	16	31	12	19	31
50	6	29	35	16	16	32	13	20	33	11	11	22
51	10	21	31	8	18	26	7	14	21	6	7	13
52	6	11	17	5	4	9	8	12	20	1	6	7
53	9	18	27	1	4	5	4	5	9	4	5	9
54	4	8	12	0	0	0	1	1	2	0	7	7
55	4	6	10	2	3	5	1	6	7	0	0	0
56	1	6	7	1	4	5	1	2	3	1	1	2
57	-	5	5	-	0	0	-	1	1	-	-	-
58	-	1	1	-	0	0	-	0	0	-	-	-
59	-	4	4	-	0	0	-	0	0	-	-	-
60	-	-	-	-	1	1	-	0	0	-	-	-
61	-	-	-	-	-	-	-	1	1	-	-	-
62	-	-	-	-	-	-	-	0	0	-	-	-
63	-	-	-	-	-	-	-	1	1	-	-	-
64	-	-	-	-	-	-	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX TABLE 3 (CONT'D)

SET NO.	23			29			32			33		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
66	-	-	-	-	-	-	-	-	-	-	-	-
67	-	-	-	-	-	-	-	-	-	-	-	-
68	-	-	-	-	-	-	-	-	-	-	-	-
69	-	-	-	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	-	-	-	-
71	-	-	-	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-	-	-
74	-	-	-	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	91	180	271	138	182	320	119	187	306	173	182	355

APPENDIX TABLE 3 (CONT'D)

SET NO.	35			37			38			40		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	1	1	-	-	-
37	-	-	-	-	-	-	-	0	0	-	-	-
38	-	-	-	-	-	-	-	0	0	-	-	-
39	-	-	-	-	-	-	-	0	0	-	-	-
40	-	-	-	-	-	-	-	0	0	-	-	-
41	-	-	-	-	-	-	-	0	0	-	-	-
42	-	-	-	-	-	-	-	0	0	-	-	-
43	-	-	-	-	-	-	1	0	1	-	-	-
44	-	-	-	-	-	-	1	1	2	-	-	-
45	2	1	3	1	-	1	4	1	5	-	1	1
46	1	2	3	0	-	0	1	1	2	2	1	3
47	1	2	3	2	1	3	1	6	7	0	3	3
48	2	1	3	1	4	5	2	7	9	1	1	2
49	3	4	7	2	3	5	4	6	10	3	2	5
50	4	7	11	5	0	5	8	5	13	3	9	12
51	2	5	7	4	2	6	2	7	9	6	6	12
52	7	6	13	5	6	11	5	2	7	4	10	14
53	2	3	5	5	5	10	6	9	15	7	3	10
54	4	8	12	3	7	10	6	13	19	5	10	15
55	1	5	6	2	6	8	1	8	9	3	15	18
56	2	8	10	2	8	10	3	4	7	2	5	7
57	1	2	3	1	7	8	0	5	5	2	11	13
58	0	2	2	-	7	7	0	0	0	0	3	3
59	1	2	3	-	0	0	1	4	5	2	5	7
60	-	5	5	-	3	3	-	2	2	-	3	3
61	-	1	1	-	3	3	-	2	2	-	3	3
62	-	0	0	-	0	0	-	1	1	-	1	1
63	-	0	0	-	1	1	-	1	1	-	0	0
64	-	0	0	-	1	1	-	1	1	-	0	0
65	-	0	0	-	2	2	-	-	-	-	0	0

APPENDIX TABLE 3 (CONT'D)

SET NO. FORK LENGTH (CM)	35			37			38			40		
	M	F	T	M	F	T	M	F	T	M	F	T
66	-	0	0	-	1	1	-	-	-	-	1	1
67	-	1	1	-	-	-	-	-	-	-	-	-
68	-	0	0	-	-	-	-	-	-	-	-	-
69	-	0	0	-	-	-	-	-	-	-	-	-
70	-	1	1	-	-	-	-	-	-	-	-	-
71	-	0	0	-	-	-	-	-	-	-	-	-
72	-	0	0	-	-	-	-	-	-	-	-	-
73	-	0	0	-	-	-	-	-	-	-	-	-
74	-	0	0	-	-	-	-	-	-	-	-	-
75	-	0	0	-	-	-	-	-	-	-	-	-
76	-	1	1	-	-	-	-	-	-	-	-	-
TOTAL	33	67	100	33	67	100	46	87	133	40	93	133

APPENDIX TABLE 3 (CONT'D)

FORK LENGTH (CM)	TOTAL		
	M	F	T
23	-	1	1
24	-	0	0
25	-	0	0
26	1	0	1
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0
32	1	0	1
33	2	1	3
34	7	2	9
35	25	4	29
36	24	11	35
37	18	26	44
38	16	20	36
39	5	17	22
40	6	16	22
41	3	6	9
42	7	10	17
43	31	19	50
44	44	37	81
45	84	81	165
46	103	133	236
47	109	146	255
48	114	157	271
49	100	142	242
50	103	162	265
51	83	140	223
52	73	113	186
53	63	108	171
54	45	99	144
55	25	103	128
56	21	104	125
57	8	59	67
58	3	42	45
59	10	38	48
60	1	31	32
61	2	16	18
62	1	20	21
63	0	7	7
64	1	8	9
65	0	3	3

APPENDIX TABLE 3 (CONT'D)

FORK LENGTH (CM)	TOTAL		
	M	F	T
66	0	5	5
67	1	4	5
68	-	4	4
69	-	3	3
70	-	4	4
71	-	1	1
72	-	0	0
73	-	1	1
74	-	0	0
75	-	0	0
76	-	1	1
TOTAL	1140	1905	3045

APPENDIX TABLE 4. PACIFIC HAKE LENGTH FREQUENCY. R/V W. E. RICKER, AUGUST 15-31, 1987.

SET NO.	1			3			6			7		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
36	-	1	1	-	-	-	-	-	-	-	-	-
37	2	0	2	-	-	-	-	-	-	-	-	-
38	0	0	0	-	-	-	-	-	-	-	-	-
39	0	0	0	-	-	-	-	-	-	-	-	-
40	0	1	1	2	1	3	-	-	-	-	-	-
41	0	1	1	2	0	2	-	-	-	-	-	-
42	0	0	0	7	2	9	-	-	-	-	-	-
43	1	1	2	6	3	9	-	-	-	-	1	1
44	6	4	10	19	8	27	-	-	-	3	3	6
45	5	6	11	16	11	27	-	1	1	5	3	8
46	9	9	18	10	15	25	-	1	1	2	3	5
47	8	9	17	8	11	19	1	3	4	12	11	23
48	2	9	11	4	2	6	2	3	5	10	11	21
49	4	9	13	6	9	15	3	1	4	14	12	26
50	7	6	13	8	9	17	1	1	2	12	9	21
51	5	7	12	6	1	7	5	2	7	11	11	22
52	8	4	12	4	3	7	1	0	1	15	11	26
53	1	6	7	4	5	9	-	1	1	11	10	21
54	0	5	5	3	5	8	-	4	4	12	11	23
55	1	5	6	1	3	4	-	2	2	7	10	17
56	1	5	6	-	3	3	-	2	2	5	11	16
57	-	1	1	-	1	1	-	2	2	2	10	12
58	-	3	3	-	0	0	-	1	1	1	8	9
59	-	0	0	-	1	1	-	2	2	-	9	9
60	-	0	0	-	-	-	-	0	0	-	6	6
61	-	2	2	-	-	-	-	0	0	-	2	2
62	-	-	-	-	-	-	-	0	0	-	1	1
63	-	-	-	-	-	-	-	0	0	-	4	4
64	-	-	-	-	-	-	-	0	0	-	2	2
65	-	-	-	-	-	-	-	0	0	-	2	2
66	-	-	-	-	-	-	-	1	1	-	-	-
TOTAL	60	94	154	106	93	199	13	27	40	122	161	283

APPENDIX TABLE 4 (CONT'D)

FORK LENGTH (CM)	TOTAL		
	M	F	T
36	-	1	1
37	2	0	2
38	0	0	0
39	0	0	0
40	2	2	4
41	2	1	3
42	7	2	9
43	7	5	12
44	28	15	43
45	26	21	47
46	21	28	49
47	29	34	63
48	18	25	43
49	27	31	58
50	28	25	53
51	27	21	48
52	28	18	46
53	16	22	38
54	15	25	40
55	9	20	29
56	6	21	27
57	2	14	16
58	1	12	13
59	-	12	12
60	-	6	6
61	-	4	4
62	-	1	1
63	-	4	4
64	-	2	2
65	-	2	2
66	-	1	1
TOTAL	301	375	676

APPENDIX TABLE 5. SABLEFISH LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	1			2			4			7		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
36	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	2	-	2	-	-	-
38	-	-	-	-	-	-	0	-	0	-	-	-
39	-	-	-	1	-	1	0	1	1	-	-	-
40	-	-	-	2	-	2	3	0	3	-	-	-
41	-	-	-	1	-	1	1	1	2	-	-	-
42	-	-	-	2	-	2	1	0	1	-	-	-
43	-	-	-	2	-	2	0	0	0	-	-	-
44	-	-	-	0	-	0	0	0	0	-	-	-
45	-	-	-	0	-	0	0	0	0	-	-	-
46	-	-	-	0	1	1	0	0	0	1	-	1
47	-	-	-	2	0	2	0	0	0	0	-	0
48	-	-	-	3	2	5	0	0	0	1	-	1
49	-	-	-	2	4	6	1	0	1	0	-	0
50	1	-	1	7	3	10	2	0	2	0	-	0
51	0	-	0	6	5	11	0	1	1	1	-	1
52	0	1	1	9	0	9	1	0	1	1	-	1
53	0	1	1	4	1	5	0	0	0	0	-	0
54	1	0	1	3	1	4	0	0	0	0	1	1
55	0	1	1	5	1	6	1	0	1	0	0	0
56	0	0	0	3	1	4	0	0	0	0	0	0
57	0	0	0	1	1	2	0	0	0	0	0	0
58	1	2	3	1	2	3	0	2	2	0	0	0
59	0	0	0	0	1	1	0	2	2	0	0	0
60	2	0	2	1	0	1	0	0	0	0	0	0
61	1	0	1	1	2	3	2	0	2	0	0	0
62	3	0	3	0	2	2	1	1	2	1	0	1
63	0	0	0	0	-	0	4	2	6	0	0	0
64	1	0	1	1	-	1	3	0	3	0	0	0
65	3	2	5	0	-	0	0	0	0	0	0	0
66	2	2	4	0	-	0	3	3	6	1	0	1
67	0	1	1	0	-	0	3	1	4	1	0	1
68	1	0	1	0	-	0	0	2	2	-	1	1
69	0	0	0	0	-	0	0	1	1	-	0	0
70	0	0	0	1	-	1	2	4	6	-	1	1
71	0	0	0	-	-	-	1	0	1	-	0	0
72	1	1	2	-	-	-	4	0	4	-	0	0
73	0	0	0	-	-	-	0	3	3	-	0	0
74	0	0	0	-	-	-	0	2	3	-	0	0
75	1	0	1	-	-	-	0	5	5	-	1	1
76	-	1	1	-	-	-	1	2	3	-	-	-
77	-	1	1	-	-	-	-	2	2	-	-	-
78	-	-	-	-	-	-	-	1	1	-	-	-

APPENDIX TABLE 5 (CONT'D)

SET NO.	1			2			4			7		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
79	-	-	-	-	-	-	-	1	1	-	-	-
80	-	-	-	-	-	-	-	2	2	-	-	-
81	-	-	-	-	-	-	-	1	1	-	-	-
82	-	-	-	-	-	-	-	0	0	-	-	-
83	-	-	-	-	-	-	-	0	0	-	-	-
84	-	-	-	-	-	-	-	1	1	-	-	-
TOTAL	18	13	31	58	27	85	36	41	78	7	4	11

APPENDIX TABLE 5 (CONT'D)

SET NO. FORK LENGTH (CM)	8			9			10			11		
	M	F	T	M	F	T	M	F	T	M	F	T
36	-	-	-	1	-	1	-	-	-	-	-	-
37	2	-	2	0	-	0	-	-	-	-	-	-
38	0	-	0	0	-	0	-	-	-	-	-	-
39	1	1	2	2	-	2	1	2	3	-	-	-
40	2	0	2	0	-	0	0	1	1	-	-	-
41	0	0	0	1	-	1	1	0	1	-	-	-
42	2	0	2	0	-	0	1	0	1	-	-	-
43	2	2	4	0	-	0	0	1	1	-	-	-
44	3	0	3	0	-	0	0	-	0	1	-	1
45	0	0	0	0	-	0	0	-	0	0	-	0
46	3	2	5	0	-	0	0	-	0	1	1	2
47	3	0	3	0	-	0	1	-	1	0	0	0
48	1	0	1	1	-	1	-	-	-	1	2	3
49	6	0	6	1	-	1	-	-	-	0	0	0
50	8	0	8	0	-	0	-	-	-	0	2	2
51	2	1	3	0	-	0	-	-	-	0	-	0
52	3	2	5	0	-	0	-	-	-	1	-	1
53	4	2	6	2	-	2	-	-	-	0	-	0
54	3	2	5	-	-	-	-	-	-	0	-	0
55	3	0	3	-	-	-	-	-	-	0	-	0
56	2	2	4	-	-	-	-	-	-	2	-	2
57	2	0	2	-	-	-	-	-	-	0	-	0
58	2	1	3	-	-	-	-	-	-	0	-	0
59	2	1	3	-	-	-	-	-	-	0	-	0
60	5	1	6	-	-	-	-	-	-	1	-	1
61	0	0	0	-	-	-	-	-	-	1	-	1
62	1	2	3	-	-	-	-	-	-	1	-	1
63	2	0	2	-	-	-	-	-	-	0	-	0
64	1	0	1	-	-	-	-	-	-	0	-	0
65	1	2	3	-	-	-	-	-	-	0	-	0
66	-	0	0	-	-	-	-	-	-	0	-	0
67	-	0	0	-	-	-	-	-	-	0	-	0
68	-	0	0	-	-	-	-	-	-	0	-	0
69	-	0	0	-	-	-	-	-	-	1	-	1
70	-	0	0	-	-	-	-	-	-	0	-	0
71	-	0	0	-	-	-	-	-	-	0	-	0
72	-	0	0	-	-	-	-	-	-	1	-	1
73	-	0	0	-	-	-	-	-	-	1	-	1
74	-	0	0	-	-	-	-	-	-	-	-	-
75	-	0	0	-	-	-	-	-	-	-	-	-
76	-	1	1	-	-	-	-	-	-	-	-	-
77	-	-	-	-	-	-	-	-	-	-	-	-
78	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX TABLE 5 (CONT'D)

SET NO. FORK LENGTH (CM)	8			9			10			11		
	M	F	T	M	F	T	M	F	T	M	F	T
79	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-	-	-
83	-	-	-	-	-	-	-	-	-	-	-	-
84	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	66	22	88	8	0	8	4	4	8	12	5	17

APPENDIX TABLE 5 (CONT'D)

SET NO. FORK LENGTH (CM)	12			13			14			15		
	M	F	T	M	F	T	M	F	T	M	F	T
36	-	-	-	-	1	1	-	-	-	-	-	-
37	-	-	-	-	0	0	-	-	-	-	-	-
38	-	-	-	1	1	2	-	-	-	-	-	-
39	-	-	-	-	1	1	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	1	-	1	-	-	-
42	-	-	-	-	-	-	1	-	1	-	-	-
43	-	-	-	-	-	-	0	1	1	-	-	-
44	-	-	-	-	-	-	0	1	1	-	-	-
45	-	-	-	-	-	-	2	0	2	-	-	-
46	-	-	-	-	-	-	0	1	1	-	-	-
47	-	-	-	-	-	-	4	0	4	-	-	-
48	1	-	1	-	-	-	3	3	6	-	-	-
49	0	-	0	-	-	-	4	0	4	-	-	-
50	0	-	0	-	-	-	3	2	5	-	1	1
51	0	-	0	-	-	-	1	2	3	1	1	2
52	0	-	0	-	-	-	1	1	2	0	0	0
53	0	-	0	-	-	-	2	0	2	0	0	0
54	0	-	0	-	-	-	1	2	3	1	1	2
55	0	-	0	-	-	-	0	2	2	1	1	2
56	0	-	0	-	-	-	2	1	3	0	1	1
57	0	-	0	-	-	-	0	0	0	0	0	0
58	2	-	2	-	-	-	3	1	4	3	0	3
59	0	-	0	-	-	-	3	0	3	1	0	1
60	0	-	0	-	-	-	4	0	4	1	1	2
61	0	-	0	-	-	-	6	0	6	5	3	8
62	0	1	1	-	-	-	2	0	2	0	2	2
63	2	-	2	-	-	-	1	0	1	2	1	3
64	0	-	0	-	-	-	1	1	2	4	0	4
65	0	-	0	-	-	-	2	0	2	4	2	6
66	0	-	0	-	-	-	2	0	2	1	4	5
67	0	-	0	-	-	-	0	1	1	4	2	6
68	0	-	0	-	-	-	0	0	0	4	3	7
69	0	-	0	-	-	-	0	0	0	0	3	3
70	0	-	0	-	-	-	0	1	1	1	5	6
71	0	-	0	-	-	-	0	0	0	1	0	1
72	0	-	0	-	-	-	0	1	1	0	1	1
73	0	-	0	-	-	-	1	1	2	1	1	2
74	0	-	0	-	-	-	-	0	0	-	1	1
75	1	-	1	-	-	-	-	1	1	-	0	0
76	-	-	-	-	-	-	-	-	-	-	1	1
77	-	-	-	-	-	-	-	-	-	-	0	0
78	-	-	-	-	-	-	-	-	-	-	0	0

APPENDIX TABLE 5 (CONT'D)

SET NO. FORK LENGTH (CM)	12			13			14			15		
	M	F	T	M	F	T	M	F	T	M	F	T
79	-	-	-	-	-	-	-	-	-	-	2	2
80	-	-	-	-	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-	-	-
83	-	-	-	-	-	-	-	-	-	-	-	-
84	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	6	1	7	1	3	4	50	23	73	35	37	72

APPENDIX TABLE 5 (CONT'D)

SET NO. FORK LENGTH (CM)	16			17			28			TOTAL		
	M	F	T	M	F	T	M	F	T	M	F	T
36	-	-	-	-	-	-	-	-	-	1	1	2
37	-	-	-	-	-	-	-	-	-	4	0	4
38	-	-	-	-	-	-	-	-	-	1	1	2
39	-	-	-	-	-	-	-	-	-	5	5	10
40	-	-	-	-	-	-	-	-	-	7	1	8
41	-	-	-	-	-	-	-	-	-	5	1	6
42	-	-	-	-	-	-	-	-	-	7	0	7
43	-	-	-	-	-	-	-	-	-	4	4	8
44	-	-	-	-	-	-	-	-	-	4	1	5
45	-	-	-	-	-	-	-	-	-	2	0	2
46	-	-	-	-	-	-	-	-	-	5	5	10
47	-	-	-	-	-	-	-	-	-	10	0	10
48	-	-	-	-	-	-	-	1	1	11	8	19
49	-	-	-	-	-	-	1	0	1	15	4	9
50	-	-	-	-	-	-	0	0	0	21	8	29
51	-	-	-	-	-	-	0	0	0	11	10	21
52	-	-	-	-	-	-	0	0	0	16	4	20
53	-	-	-	-	-	-	0	1	1	12	5	17
54	-	-	-	-	-	-	0	1	1	9	8	17
55	-	-	-	-	-	-	2	1	3	12	6	18
56	-	-	-	-	-	-	0	1	1	9	6	15
57	-	-	-	-	-	-	0	1	1	3	2	5
58	-	-	-	-	-	-	0	1	1	12	9	21
59	-	-	-	-	-	-	0	0	0	6	4	10
60	-	-	-	-	-	-	0	0	0	14	2	16
61	-	-	-	-	-	-	0	1	1	16	6	22
62	-	-	-	1	-	1	0	0	0	10	8	18
63	-	-	-	0	-	0	0	0	0	11	3	14
64	-	-	-	0	-	0	0	0	0	11	1	12
65	-	-	-	0	-	0	0	0	0	10	6	16
66	-	-	-	0	-	0	1	0	1	10	9	19
67	-	1	1	0	-	0	-	0	0	8	6	14
68	-	1	1	0	-	0	-	0	0	5	7	12
69	-	0	0	0	-	0	-	0	0	1	4	5
70	-	0	0	1	-	1	-	0	0	5	11	16
71	-	0	0	-	-	-	-	0	0	2	0	2
72	1	0	1	-	-	-	-	0	0	7	3	10
73	-	0	0	-	-	-	-	1	1	3	6	9
74	-	0	0	-	-	-	-	-	-	0	3	4
75	-	1	1	-	-	-	-	-	-	2	8	10
76	-	-	-	-	-	-	-	-	-	1	5	6
77	-	-	-	-	-	-	-	-	-	-	3	3
78	-	-	-	-	-	-	-	-	-	-	1	1

APPENDIX TABLE 5 (cont'd)

SET NO. FORK LENGTH (CM)	16			17			28			TOTAL		
	M	F	T	M	F	T	M	F	T	M	F	T
79	-	-	-	-	-	-	-	-	-	-	3	3
80	-	-	-	-	-	-	-	-	-	-	2	2
81	-	-	-	-	-	-	-	-	-	-	1	1
82	-	-	-	-	-	-	-	-	-	-	0	0
83	-	-	-	-	-	-	-	-	-	-	0	0
84	-	-	-	-	-	-	-	-	-	-	1	1
TOTAL	1	3	4	2	0	2	4	9	13	308	192	501

APPENDIX TABLE 6 . SPINY DOGFISH LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	1			7			8			9		
TOTAL LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
44	-	-	-	-	-	-	-	-	-	-	1	1
45	-	-	-	-	-	-	-	-	-	-	0	0
46	-	-	-	-	-	-	-	-	-	-	0	0
47	-	-	-	-	-	-	-	-	-	-	0	0
48	-	-	-	-	-	-	-	-	-	-	0	0
49	-	-	-	-	-	-	-	-	-	-	0	0
50	-	-	-	-	-	-	-	-	-	-	0	0
51	-	-	-	1	-	1	-	-	-	1	0	1
52	-	-	-	0	-	0	-	-	-	0	0	0
53	-	-	-	0	-	0	-	-	-	0	0	0
54	-	-	-	0	-	0	1	-	1	1	0	1
55	-	-	-	0	-	0	0	-	0	1	1	2
56	-	-	-	0	-	0	0	2	2	1	2	3
57	-	-	-	0	-	0	1	1	2	2	0	2
58	-	-	-	0	-	0	2	1	3	0	0	0
59	-	-	-	0	-	0	2	0	2	2	1	3
60	-	-	-	0	-	0	2	3	5	0	5	5
61	-	1	1	0	1	1	1	6	7	0	2	2
62	-	1	1	0	0	0	3	3	6	3	2	5
63	-	0	0	1	0	1	2	5	7	2	3	5
64	-	0	0	1	0	1	2	4	6	2	3	5
65	-	0	0	0	1	1	4	5	9	1	1	2
66	-	0	0	0	1	1	2	0	2	0	0	0
67	-	0	0	0	0	0	6	4	10	1	0	1
68	-	0	0	0	0	0	3	2	5	1	0	1
69	1	0	1	1	1	2	4	6	10	1	0	1
70	0	2	2	0	0	0	0	3	3	1	0	1
71	0	0	0	2	0	2	0	0	0	1	2	3
72	0	1	1	0	1	1	1	3	4	2	1	3
73	1	0	1	0	0	0	1	1	2	1	1	2
74	0	2	2	3	0	3	1	2	3	0	0	0
75	0	0	0	0	0	0	1	1	2	2	1	3
76	1	0	1	0	1	1	2	1	3	1	0	1
77	1	0	1	1	0	1	1	0	1	0	0	0
78	1	0	1	0	0	0	0	1	1	3	0	3
79	0	0	0	2	0	2	0	1	1	2	0	2
80	0	0	0	1	0	1	0	0	0	3	1	4
81	1	0	1	0	0	0	0	0	0	1	-	1
82	1	0	1	0	0	0	1	0	1	5	-	5
83	1	0	1	0	1	1	-	1	1	2	-	2
84	1	0	1	1	-	1	-	-	-	0	-	1
85	-	0	0	0	-	0	-	-	-	1	-	1
86	-	0	0	1	-	1	-	-	-	1	-	1

APPENDIX TABLE 6 (CONT'D)

SET NO. TOTAL LENGTH (CM)	1			7			8			9		
	M	F	T	M	F	T	M	F	T	M	F	T
87	-	0	0	-	-	-	-	-	-	2	-	2
88	-	0	0	-	-	-	-	-	-	1	-	1
89	-	0	0	-	-	-	-	-	-	0	-	0
90	-	0	0	-	-	-	-	-	-	1	-	1
91	-	0	0	-	-	-	-	-	-	-	-	-
92	-	0	0	-	-	-	-	-	-	-	-	-
93	-	0	0	-	-	-	-	-	-	-	-	-
94	-	0	0	-	-	-	-	-	-	-	-	-
95	-	1	1	-	-	-	-	-	-	-	-	-
96	-	-	-	-	-	-	-	-	-	-	-	-
97	-	-	-	-	-	-	-	-	-	-	-	-
98	-	-	-	-	-	-	-	-	-	-	-	-
99	-	-	-	-	-	-	-	-	-	-	-	-
100	-	-	-	-	-	-	-	-	-	-	-	-
101	-	-	-	-	-	-	-	-	-	-	-	-
102	-	-	-	-	-	-	-	-	-	-	-	-
103	-	-	-	-	-	-	-	-	-	-	-	-
104	-	-	-	-	-	-	-	-	-	-	-	-
105	-	-	-	-	-	-	-	-	-	-	-	-
106	-	-	-	-	-	-	-	-	-	-	-	-
107	-	-	-	-	-	-	-	-	-	-	-	-
108	-	-	-	-	-	-	-	-	-	-	-	-
109	-	-	-	-	-	-	-	-	-	-	-	-
110	-	-	-	-	-	-	-	-	-	-	-	-
111	-	-	-	-	-	-	-	-	-	-	-	-
112	-	-	-	-	-	-	-	-	-	-	-	-
113	-	-	-	-	-	-	-	-	-	-	-	-
114	-	-	-	-	-	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-	-	-	-	-	-
116	-	-	-	-	-	-	-	-	-	-	-	-
117	-	-	-	-	-	-	-	-	-	-	-	-
118	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	9	8	17	15	7	22	43	56	99	49	27	77

APPENDIX TABLE 6 (CONT'D)

SET NO. TOTAL LENGTH (CM)	10			11			12			15		
	M	F	T	M	F	T	M	F	T	M	F	T
44	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-	-	-	-	-	-
54	-	-	-	1	-	1	-	-	-	-	-	-
55	-	-	-	0	-	0	1	1	2	-	-	-
56	-	-	-	0	-	0	0	0	0	-	-	-
57	-	-	-	0	-	0	0	0	0	-	-	-
58	-	-	-	0	-	0	1	0	1	-	-	-
59	-	-	-	0	-	0	1	1	2	1	-	1
60	-	-	-	1	1	2	2	1	3	0	-	0
61	-	1	1	0	1	1	1	2	3	0	-	0
62	-	0	0	1	0	1	3	2	5	0	-	0
63	-	0	0	0	0	0	3	2	5	0	-	0
64	-	0	0	0	2	2	5	2	7	1	-	1
65	-	0	0	1	0	1	4	5	10	0	-	0
66	-	0	0	0	1	1	3	1	4	0	-	0
67	-	0	0	0	0	0	1	0	1	1	-	1
68	-	0	0	0	0	0	1	1	2	0	-	0
69	-	0	0	2	0	2	2	3	5	0	1	1
70	-	0	0	0	0	0	3	0	3	0	0	0
71	-	0	0	1	0	1	7	1	8	1	0	1
72	-	0	0	0	0	0	5	0	5	0	0	0
73	-	1	1	0	0	0	2	1	3	0	0	0
74	-	0	0	0	0	0	3	-	3	1	1	2
75	-	0	0	1	1	2	2	-	2	0	0	0
76	-	0	0	0	1	1	3	-	3	1	0	1
77	-	0	0	0	0	0	1	-	1	1	0	1
78	-	0	0	0	0	0	1	-	1	0	0	0
79	-	0	0	0	0	0	2	-	2	0	0	0
80	-	0	0	0	0	0	2	-	2	0	0	0
81	-	0	0	1	0	1	1	-	1	1	0	1
82	1	0	1	-	0	0	1	-	1	0	0	0
83	0	0	0	-	0	0	0	-	0	0	0	0
84	2	0	2	-	0	0	2	-	2	0	0	0
85	1	0	1	-	0	0	2	-	2	0	0	0
86	0	0	0	-	0	0	-	-	-	0	0	0

APPENDIX TABLE 6 (CONT'D)

SET NO. TOTAL LENGTH (CM)	10			11			12			15		
	M	F	T	M	F	T	M	F	T	M	F	T
87	0	0	0	-	0	0	-	-	-	1	0	1
88	1	0	1	-	0	0	-	-	-	-	0	0
89	-	0	0	-	0	0	-	-	-	-	0	0
90	-	0	0	-	0	0	-	-	-	-	0	0
91	-	0	0	-	0	0	-	-	-	-	0	0
92	-	0	0	-	0	0	-	-	-	-	0	0
93	-	0	0	-	0	0	-	-	-	-	1	1
94	-	0	0	-	0	0	-	-	-	-	-	-
95	-	0	0	-	0	0	-	-	-	-	-	-
96	-	0	0	-	0	0	-	-	-	-	-	-
97	-	0	0	-	0	0	-	-	-	-	-	-
98	-	0	0	-	0	0	-	-	-	-	-	-
99	-	0	0	-	0	0	-	-	-	-	-	-
100	-	0	0	-	0	0	-	-	-	-	-	-
101	-	0	0	-	1	1	-	-	-	-	-	-
102	-	0	0	-	-	-	-	-	-	-	-	-
103	-	0	0	-	-	-	-	-	-	-	-	-
104	-	0	0	-	-	-	-	-	-	-	-	-
105	-	0	0	-	-	-	-	-	-	-	-	-
106	-	0	0	-	-	-	-	-	-	-	-	-
107	-	0	0	-	-	-	-	-	-	-	-	-
108	-	1	1	-	-	-	-	-	-	-	-	-
109	-	0	0	-	-	-	-	-	-	-	-	-
110	-	0	0	-	-	-	-	-	-	-	-	-
111	-	0	0	-	-	-	-	-	-	-	-	-
112	-	0	0	-	-	-	-	-	-	-	-	-
113	-	0	0	-	-	-	-	-	-	-	-	-
114	-	0	0	-	-	-	-	-	-	-	-	-
115	-	0	0	-	-	-	-	-	-	-	-	-
116	-	0	0	-	-	-	-	-	-	-	-	-
117	-	0	0	-	-	-	-	-	-	-	-	-
118	-	1	1	-	-	-	-	-	-	-	-	-
TOTAL	5	4	9	9	8	17	65	23	89	9	3	12

APPENDIX TABLE 6 (CONT'D)

SET NO.	16			24			25			34		
TOTAL LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
44	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	1	1	1	-	1	1	-	1
53	-	-	-	-	0	0	0	1	1	0	-	0
54	-	-	-	-	0	0	0	0	0	0	1	1
55	-	-	-	-	0	0	0	0	0	1	0	1
56	-	-	-	-	0	0	1	2	3	0	1	1
57	-	1	1	-	0	0	1	0	1	0	0	0
58	-	0	0	-	0	0	1	1	2	1	0	1
59	-	0	0	-	0	0	4	4	8	1	1	2
60	-	0	0	-	2	2	2	3	5	0	0	0
61	-	2	2	1	0	1	4	6	10	2	3	5
62	-	1	1	1	0	1	2	5	7	3	0	3
63	-	0	0	0	1	1	3	2	5	0	1	1
64	-	0	0	0	2	2	2	4	6	2	0	2
65	-	1	1	1	0	1	2	6	8	2	1	3
66	-	1	1	1	0	1	2	3	5	1	0	1
67	-	1	1	1	1	2	0	2	2	1	0	1
68	-	0	0	0	0	0	2	4	6	2	1	3
69	-	0	0	1	0	1	2	4	6	0	0	0
70	-	1	1	1	1	2	0	1	1	1	2	3
71	1	4	5	1	0	1	2	1	3	1	1	2
72	1	0	1	0	0	0	1	1	2	0	1	1
73	1	0	1	1	0	1	1	1	2	1	1	2
74	1	3	4	3	1	4	1	3	4	3	1	4
75	5	0	5	2	0	2	0	1	1	1	1	2
76	0	2	2	1	0	1	1	0	1	3	0	3
77	3	1	4	1	0	1	0	0	0	2	0	2
78	0	2	2	4	0	4	1	0	1	4	1	5
79	1	0	1	2	0	2	0	1	1	2	1	3
80	2	1	3	2	0	2	2	0	2	5	-	5
81	0	1	1	6	0	6	1	1	2	7	-	7
82	1	0	1	9	0	9	0	0	0	2	-	2
83	4	0	4	3	0	3	0	0	0	5	-	5
84	4	0	4	3	0	3	1	1	2	6	-	6
85	5	0	5	4	1	5	0	-	0	2	-	2
86	2	1	3	10	-	10	0	-	0	6	-	6

APPENDIX TABLE 6 (CONT'D)

SET NO. TOTAL LENGTH (CM)	16			24			25			34		
	M	F	T	M	F	T	M	F	T	M	F	T
87	1	1	2	6	-	6	0	-	0	4	-	4
88	0	0	0	4	-	4	0	-	0	2	-	2
89	2	1	3	3	-	3	0	-	0	3	-	3
90	1	-	1	3	-	3	0	-	0	1	-	1
91	1	-	1	0	-	0	0	-	0	2	-	2
92	0	-	0	0	-	0	1	-	1	-	-	-
93	1	-	1	1	-	1	-	-	-	-	-	-
94	-	-	-	2	-	2	-	-	-	-	-	-
95	-	-	-	-	-	-	-	-	-	-	-	-
96	-	-	-	-	-	-	-	-	-	-	-	-
97	-	-	-	-	-	-	-	-	-	-	-	-
98	-	-	-	-	-	-	-	-	-	-	-	-
99	-	-	-	-	-	-	-	-	-	-	-	-
100	-	-	-	-	-	-	-	-	-	-	-	-
101	-	-	-	-	-	-	-	-	-	-	-	-
102	-	-	-	-	-	-	-	-	-	-	-	-
103	-	-	-	-	-	-	-	-	-	-	-	-
104	-	-	-	-	-	-	-	-	-	-	-	-
105	-	-	-	-	-	-	-	-	-	-	-	-
106	-	-	-	-	-	-	-	-	-	-	-	-
107	-	-	-	-	-	-	-	-	-	-	-	-
108	-	-	-	-	-	-	-	-	-	-	-	-
109	-	-	-	-	-	-	-	-	-	-	-	-
110	-	-	-	-	-	-	-	-	-	-	-	-
111	-	-	-	-	-	-	-	-	-	-	-	-
112	-	-	-	-	-	-	-	-	-	-	-	-
113	-	-	-	-	-	-	-	-	-	-	-	-
114	-	-	-	-	-	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-	-	-	-	-	-
116	-	-	-	-	-	-	-	-	-	-	-	-
117	-	-	-	-	-	-	-	-	-	-	-	-
118	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	37	25	62	78	10	88	41	58	99	80	18	98

APPENDIX TABLE 6 (CONT'D)

TOTAL LENGTH (CM)	TOTAL		
	M	F	T
44	-	1	1
45	-	0	0
46	-	0	0
47	-	0	0
48	-	0	0
49	-	0	0
50	-	0	0
51	2	0	2
52	2	1	3
53	0	1	1
54	3	1	4
55	3	2	5
56	2	7	9
57	4	2	6
58	5	2	7
59	11	7	18
60	7	15	22
61	9	25	34
62	16	14	30
63	11	14	25
64	15	17	32
65	15	20	36
66	9	7	16
67	11	8	19
68	9	8	17
69	14	15	29
70	6	10	16
71	17	9	26
72	10	8	18
73	9	6	15
74	16	13	29
75	14	5	19
76	13	5	18
77	11	1	12
78	14	4	18
79	11	3	14
80	17	2	19
81	19	2	21
82	21	0	21
83	15	2	17
84	20	1	22
85	15	1	16
86	20	1	21

APPENDIX TABLE 6 (CONT'D)

TOTAL LENGTH (CM)	TOTAL		
	M	F	T
87	14	1	15
88	8	0	8
89	8	1	9
90	6	0	6
91	3	0	3
92	1	0	1
93	2	1	3
94	2	0	2
95	-	1	1
96	-	0	0
97	-	0	0
98	-	0	0
99	-	0	0
100	-	0	0
101	-	1	1
102	-	0	0
103	-	0	0
104	-	0	0
105	-	0	0
106	-	0	0
107	-	0	0
108	-	1	1
109	-	0	0
110	-	0	0
111	-	0	0
112	-	0	0
113	-	0	0
114	-	0	0
115	-	0	0
116	-	0	0
117	-	0	0
118	-	1	1
TOTAL	440	247	689

APPENDIX TABLE 7. WALLEYE POLLOCK LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	1			23			TOTAL		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T
27	-	-	-	1	-	1	1	-	1
28	-	-	-	0	1	1	0	1	1
29	-	-	-	1	0	1	1	0	1
30	-	-	-	0	1	1	0	1	1
31	-	-	-	4	1	5	4	1	5
32	-	-	-	8	4	12	8	4	12
33	-	-	-	11	6	17	11	6	17
34	-	-	-	19	17	36	19	17	36
35	-	-	-	20	7	27	20	7	27
36	1	-	1	14	13	27	15	13	28
37	0	-	0	16	10	26	16	10	26
38	0	1	1	5	15	20	5	16	21
39	0	2	2	1	7	8	1	9	10
40	0	8	9	1	4	5	1	12	14
41	1	4	5	1	0	1	2	4	6
42	1	8	9	1	1	2	2	9	11
43	3	5	8	-	0	0	3	5	8
44	1	2	3	-	0	0	1	2	3
45	2	14	16	-	0	0	2	14	16
46	3	7	10	-	1	1	3	8	11
47	0	9	9	-	-	-	0	9	9
48	0	3	3	-	-	-	0	3	3
49	3	8	11	-	-	-	3	8	11
50	0	7	7	-	-	-	0	7	7
51	1	8	9	-	-	-	1	8	9
52	-	7	7	-	-	-	-	7	7
53	-	6	6	-	-	-	-	6	6
54	-	6	6	-	-	-	-	6	6
55	-	3	3	-	-	-	-	3	3
56	-	3	3	-	-	-	-	3	3
57	-	1	1	-	-	-	-	1	1
58	-	4	4	-	-	-	-	4	4
59	-	4	4	-	-	-	-	4	4
60	-	3	3	-	-	-	-	3	3
TOTAL	16	123	140	103	88	191	119	211	331

APPENDIX TABLE 8. LINGCOD LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	14			17			18			TOTAL		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
64	-	-	-	1	-	1	-	-	-	1	-	1
65	-	-	-	0	-	0	-	-	-	0	-	0
66	-	-	-	0	-	0	-	-	-	0	-	0
67	-	-	-	0	-	0	1	-	1	1	-	1
68	-	-	-	0	-	0	1	-	1	1	-	1
69	-	-	-	0	-	0	1	-	1	1	-	1
70	-	-	-	0	-	0	0	-	0	0	-	0
71	-	-	-	0	-	0	2	-	2	2	-	2
72	-	-	-	0	-	0	3	-	3	3	-	3
73	-	-	-	0	-	0	2	-	2	2	-	2
74	-	-	-	0	-	0	4	-	4	4	-	4
75	-	-	-	0	-	0	0	4	4	0	4	4
76	-	-	-	0	-	0	2	2	4	2	2	4
77	-	-	-	0	-	0	2	0	2	2	0	2
78	-	-	-	0	-	0	1	0	1	1	0	1
79	-	1	1	1	-	1	1	1	2	2	2	4
80	-	1	1	-	-	0	1	0	1	1	1	2
81	-	-	-	-	-	0	-	0	0	-	0	0
82	-	-	-	-	-	0	-	1	1	-	1	1
83	-	-	-	-	-	0	-	0	0	-	0	0
84	-	-	-	-	-	0	-	0	0	-	0	0
85	-	-	-	-	-	0	-	1	1	-	1	1
86	-	-	-	-	-	0	-	2	2	-	2	2
87	-	-	-	-	-	0	-	0	0	-	0	0
88	-	-	-	-	-	0	-	3	3	-	3	3
89	-	-	-	-	-	0	-	1	1	-	1	1
90	-	-	-	-	-	0	-	0	0	-	0	0
91	-	-	-	-	-	0	-	0	0	-	0	0
92	-	-	-	-	-	0	-	0	0	-	0	0
93	-	-	-	-	-	0	-	0	0	-	0	0
94	-	-	-	-	-	0	-	0	0	-	0	0
95	-	-	-	-	-	0	-	0	0	-	0	0
96	-	-	-	-	-	0	-	0	0	-	0	0
97	-	-	-	-	-	0	-	0	0	-	0	0
98	-	-	-	-	-	0	-	0	0	-	0	0
99	-	-	-	-	-	0	-	0	0	-	0	0
100	-	-	-	-	-	0	-	0	0	-	0	0
101	-	-	-	-	-	0	-	0	0	-	0	0
102	-	-	-	-	-	0	-	0	0	-	0	0
103	-	-	-	-	-	0	-	0	0	-	0	0
104	-	-	-	-	-	0	-	0	0	-	0	0
105	-	-	-	-	-	0	-	0	0	-	0	0
106	-	-	-	-	-	0	-	0	0	-	0	0

APPENDIX TABLE 8 (CONT'D)

SET NO.	14			17			18			TOTAL		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
107	-	-	-	-	-	0	-	0	0	-	0	0
108	-	-	-	-	-	0	-	1	1	-	1	1
109	-	-	-	-	-	0	-	-	-	-	0	0
110	-	-	-	-	-	0	-	-	-	-	0	0
111	-	-	-	-	1	1	-	-	-	-	1	1
TOTAL	0	2	2	2	1	3	21	16	37	23	19	42

APPENDIX TABLE 9. CHINOOK SALMON LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	24			25			30			34		
FORK LENGTH (CM)	M	F	T	M	F	T	M	F	T	M	F	T
50	-	-	-	-	-	-	1	-	1	-	-	-
51	-	-	-	-	-	-	0	1	1	-	-	-
52	-	-	-	-	-	-	0	0	0	-	-	-
53	-	-	-	-	-	-	1	0	1	-	-	-
54	-	-	-	-	-	-	0	0	0	-	-	-
55	-	-	-	1	1	2	0	0	0	-	-	-
56	-	-	-	0	-	0	0	0	0	-	1	1
57	-	-	-	0	-	0	0	0	0	-	1	1
58	-	-	-	0	-	0	0	0	0	1	1	2
59	-	-	-	0	-	0	0	0	0	1	0	1
60	-	-	-	0	-	0	0	2	2	-	0	0
61	-	-	-	0	-	0	0	0	0	-	0	0
62	1	-	1	0	-	0	0	1	1	-	0	0
63	0	-	0	0	-	0	0	0	0	-	1	1
64	0	-	0	0	-	0	0	0	0	-	0	0
65	2	-	2	0	-	0	0	0	0	-	1	1
66	-	-	0	0	-	0	0	0	0	-	1	1
67	-	-	0	0	-	0	0	0	0	-	0	0
68	-	-	0	1	-	1	0	0	0	-	0	0
69	-	1	1	-	-	-	0	0	0	-	0	0
70	-	1	1	-	-	-	0	0	0	-	0	0
71	-	-	-	-	-	-	1	0	1	-	0	0
72	-	-	-	-	-	-	1	0	1	-	0	0
73	-	-	-	-	-	-	-	0	0	-	0	0
74	-	-	-	-	-	-	-	0	0	-	0	0
75	-	-	-	-	-	-	-	0	0	-	0	0
76	-	-	-	-	-	-	-	0	0	-	1	1
77	-	-	-	-	-	-	-	1	1	-	0	0
78	-	-	-	-	-	-	-	-	-	-	0	0
79	-	-	-	-	-	-	-	-	-	-	0	0
80	-	-	-	-	-	-	-	-	-	-	0	0
81	-	-	-	-	-	-	-	-	-	-	0	0
82	-	-	-	-	-	-	-	-	-	-	0	0
83	-	-	-	-	-	-	-	-	-	-	0	0
84	-	-	-	-	-	-	-	-	-	-	1	1
TOTAL	3	2	5	2	1	3	4	5	9	2	8	10

APPENDIX TABLE 9 (CONT'D)

FORK LENGTH (CM)	TOTAL M	TOTAL F	TOTAL T
50	1	-	1
51	0	1	1
52	0	0	0
53	1	0	1
54	0	0	0
55	1	1	2
56	0	1	1
57	0	1	1
58	1	1	2
59	1	0	1
60	0	2	2
61	0	0	0
62	1	1	2
63	0	1	1
64	0	0	0
65	2	1	3
66	0	1	1
67	0	0	0
68	1	0	1
69	0	1	1
70	0	1	1
71	1	0	1
72	1	0	1
73	-	0	0
74	-	0	0
75	-	0	0
76	-	1	1
77	-	1	1
78	-	0	0
79	-	0	0
80	-	0	0
81	-	0	0
82	-	0	0
83	-	0	0
84	-	1	1
TOTAL	11	16	27

APPENDIX TABLE 10. HALIBUT LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	18		
FORK LENGTH (CM)	M	F	T
63	1	-	1
64	1	-	1
65	0	-	0
66	0	-	0
67	0	-	0
68	0	1	1
69	0	0	0
70	1	0	2
71	0	2	4
72	2	0	5
73	1	0	2
74	1	0	1
75	-	0	0
76	-	0	1
77	-	0	0
78	-	0	0
79	-	0	1
80	-	0	1
81	-	1	1
82	-	0	1
83	-	0	0
84	-	0	0
85	-	0	0
86	-	0	0
87	-	0	0
88	-	0	0
89	-	0	0
90	-	0	0
91	-	0	0
92	-	0	0
93	-	0	0
94	-	0	0
95	-	0	0
96	-	0	0
97	-	0	0
98	-	0	0
99	-	0	0
100	-	0	0
101	-	0	0
102	-	0	0
103	-	0	0
104	-	0	0
105	-	0	0

APPENDIX TABLE 10 (CONT'D)

SET NO.	18		
FORK LENGTH (CM)	M	F	T
106	-	0	0
107	-	0	0
108	-	0	0
109	-	0	0
110	-	0	0
111	-	0	0
112	-	0	0
113	-	0	0
114	-	0	0
115	-	0	0
116	-	0	0
117	-	0	0
118	-	0	0
119	-	0	0
120	-	0	0
121	-	0	0
122	-	0	0
123	-	0	0
124	-	0	0
125	-	0	0
126	-	0	0
127	-	0	0
128	-	0	0
129	-	0	0
130	-	0	0
131	-	0	0
132	-	0	0
133	-	0	0
134	-	0	0
135	-	0	0
136	-	0	0
137	-	0	0
138	-	0	0
139	-	0	0
140	-	0	0
141	-	0	0
142	-	0	0
143	-	0	0
144	-	1	1
TOTAL	7	5	23

APPENDIX TABLE 11. REDSTRIPED ROCKFISH LENGTH FREQUENCY. F/V CALEDONIAN, AUGUST 19-29, 1987.

SET NO.	28		
FORK LENGTH (CM)	M	F	T
28	1	1	2
29	0	0	0
30	0	1	1
31	0	0	0
32	0	0	0
33	0	0	0
34	0	2	2
35	1	3	4
36	-	0	0
37	-	0	0
38	-	1	1
TOTAL	2	8	10

FIGURES

Fig. 1. La Perouse Project fishing subareas.

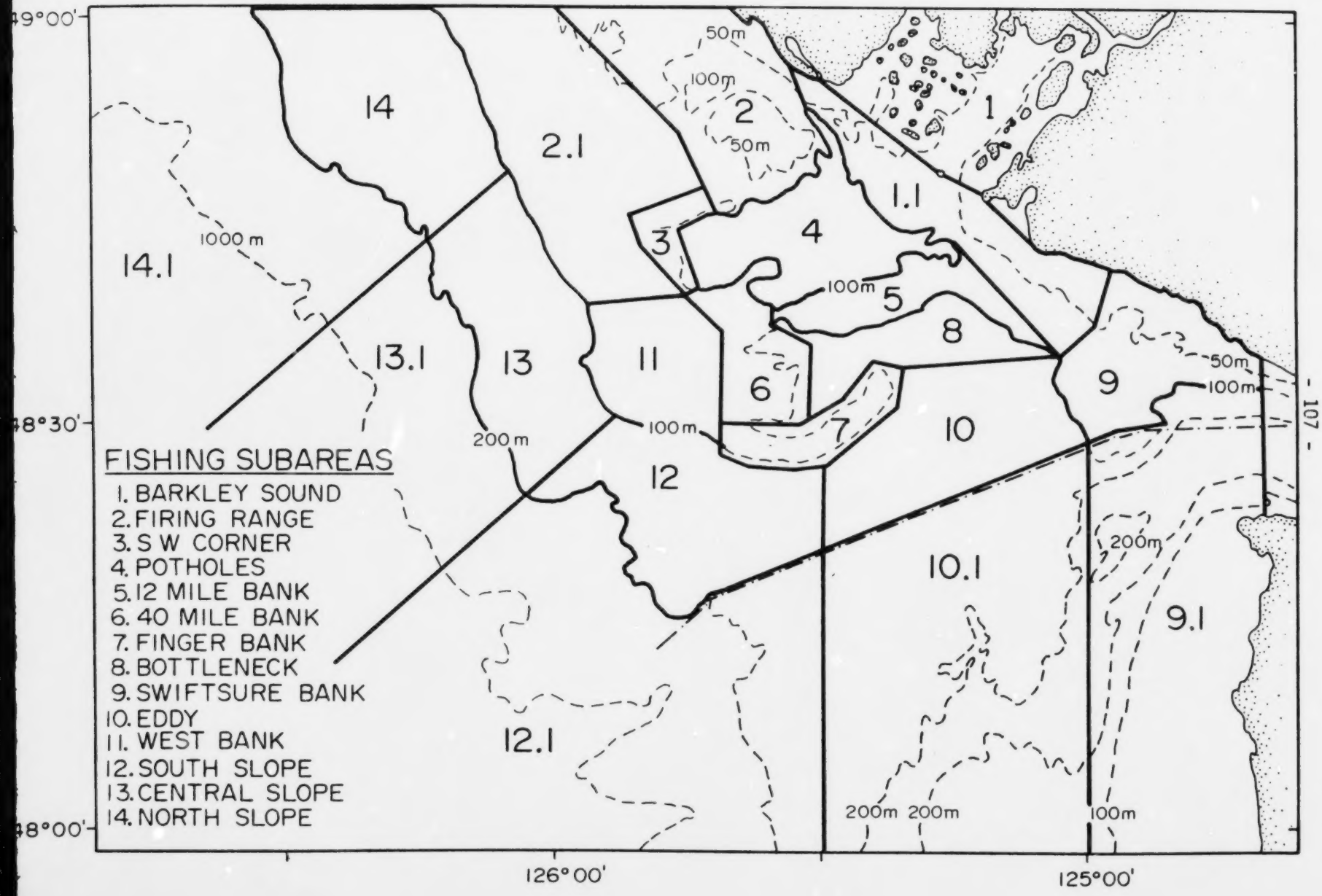
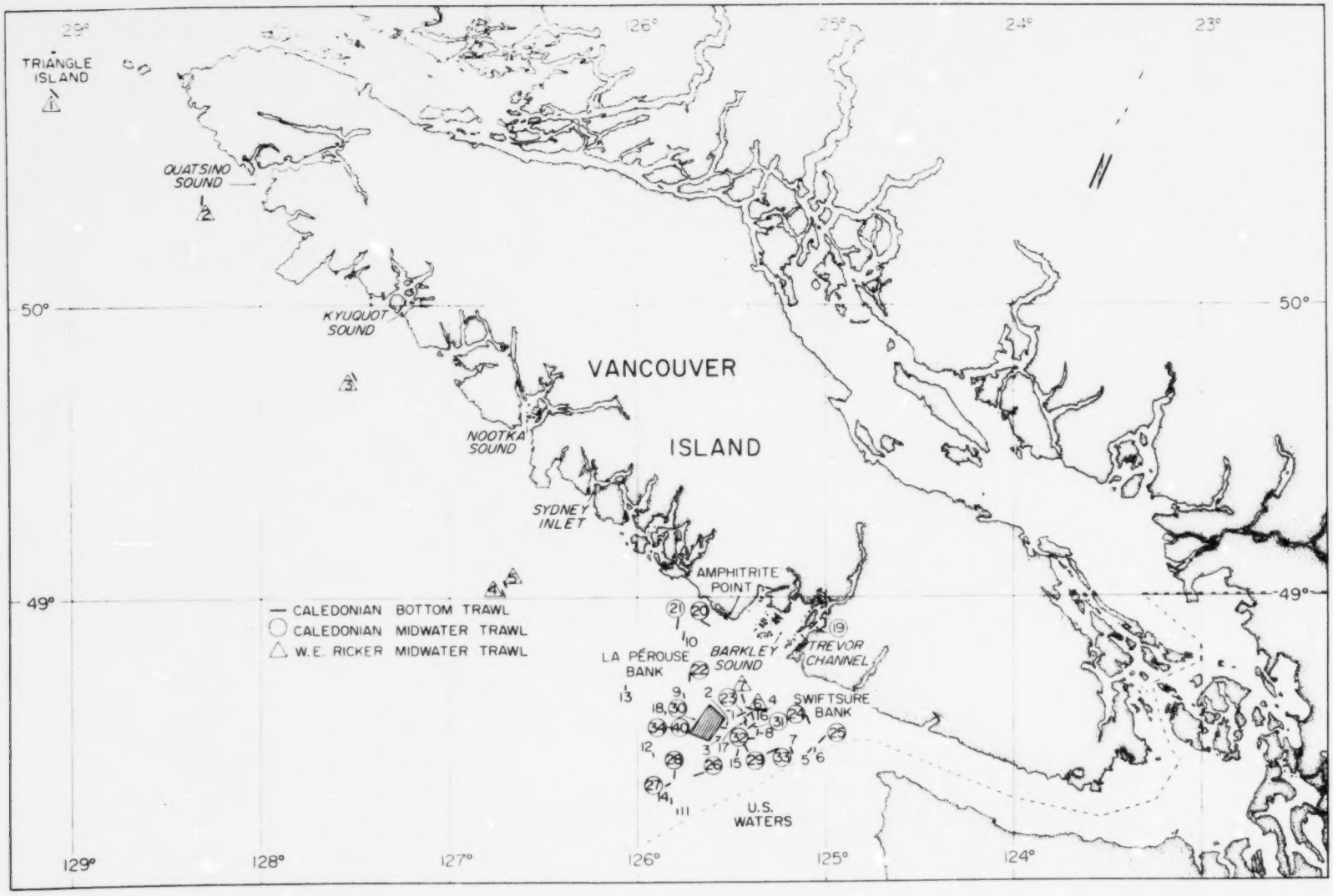

49°00'
48°30'
48°00'
126°00'
125°00'
50m
100m
200m
1000 m
1
1.1
2
2.1
3
4
5
6
7
8
9
9.1
10
10.1
11
12
12.1
13
13.1
14
14.1
FISHING SUBAREAS
1. BARKLEY SOUND
2. FIRING RANGE
3. S W CORNER
4. POTHOLES
5. 12 MILE BANK
6. 40 MILE BANK
7. FINGER BANK
8. BOTTLENECK
9. SWIFTSURE BANK
10. EDDY
11. WEST BANK
12. SOUTH SLOPE
13. CENTRAL SLOPE
14. NORTH SLOPE

Fig. 2. Trawl positions occupied by the F/V CALEDONIAN and the R/V W. E. RICKER, August 1987.


129°
128°
127°
126°
125°
124°
23°
50°
49°
TRIANGLE ISLAND
QUATSINO SOUND
KYUQUOT SOUND
NOOTKA SOUND
SYDNEY INLET
VANCOUVER ISLAND
AMPHITRITE POINT
LA PÉROUSE BANK
BARKLEY SOUND
TREVOR CHANNEL
SWIFTSURE BANK
U.S. WATERS
— CALEDONIAN BOTTOM TRAWL
○ CALEDONIAN MIDWATER TRAWL
△ W.E. RICKER MIDWATER TRAWL

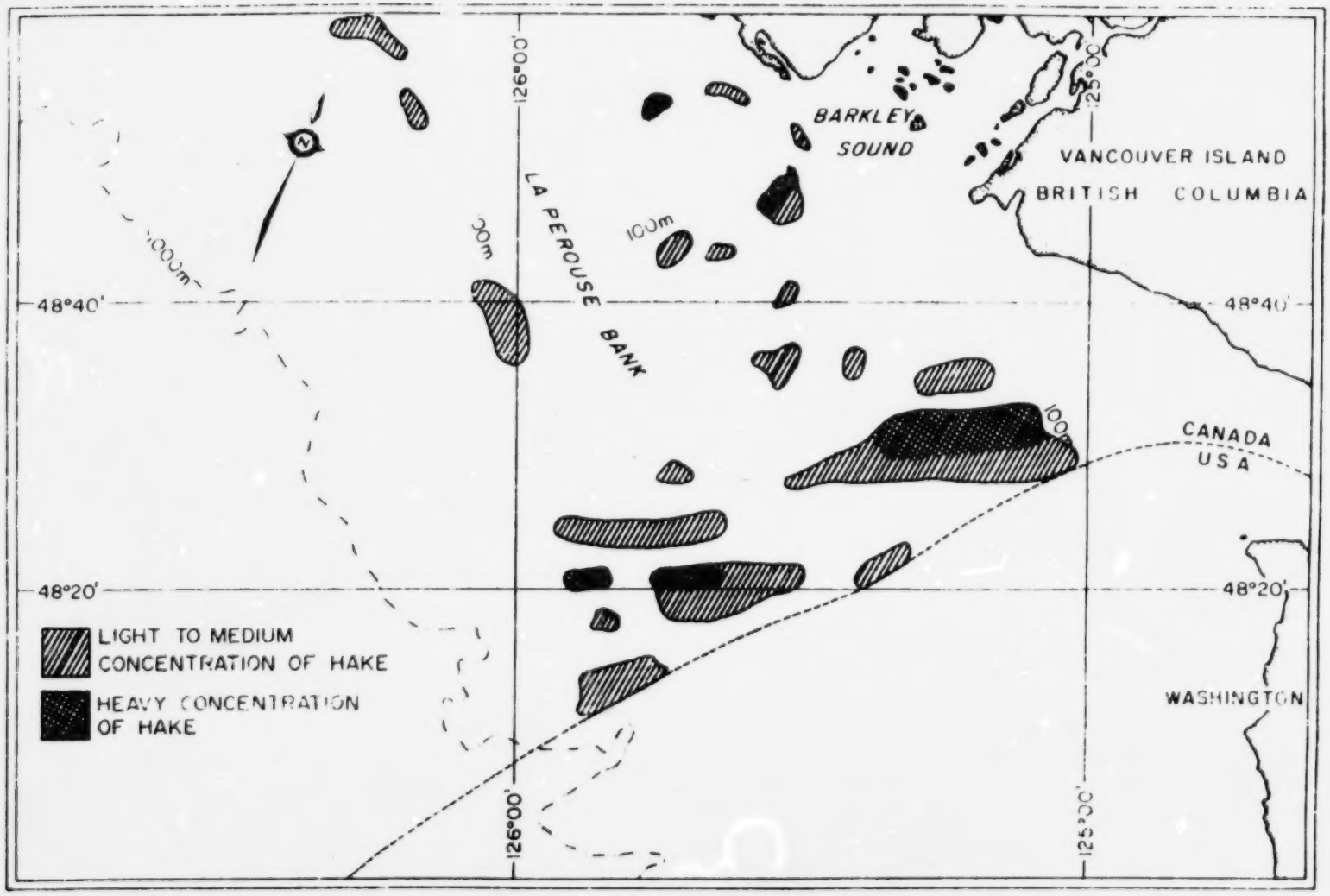


Fig. 3. Distribution of hake around La Pérouse Bank during August 1987.

Fig. 4. Density distribution of Pacific hake in survey area as estimated from the catch rate data, August, 1987. The contour intervals are in units of 20 hake/10,000 m^3. The highest observed density was 517 hake/10,000 m^3. The left hand boundary of the survey area is the 200 m isobath, top = 49°N lat, bottom = 48°N lat, right top = Barkley Sound, right bottom = 200 m isobath. The 100 m isobath is also shown.

49°00'
48°00'
BARKLEY SOUND
LA PEROUSE BANK
0
40
120
180
80
60
40
20
200m
100m
200m

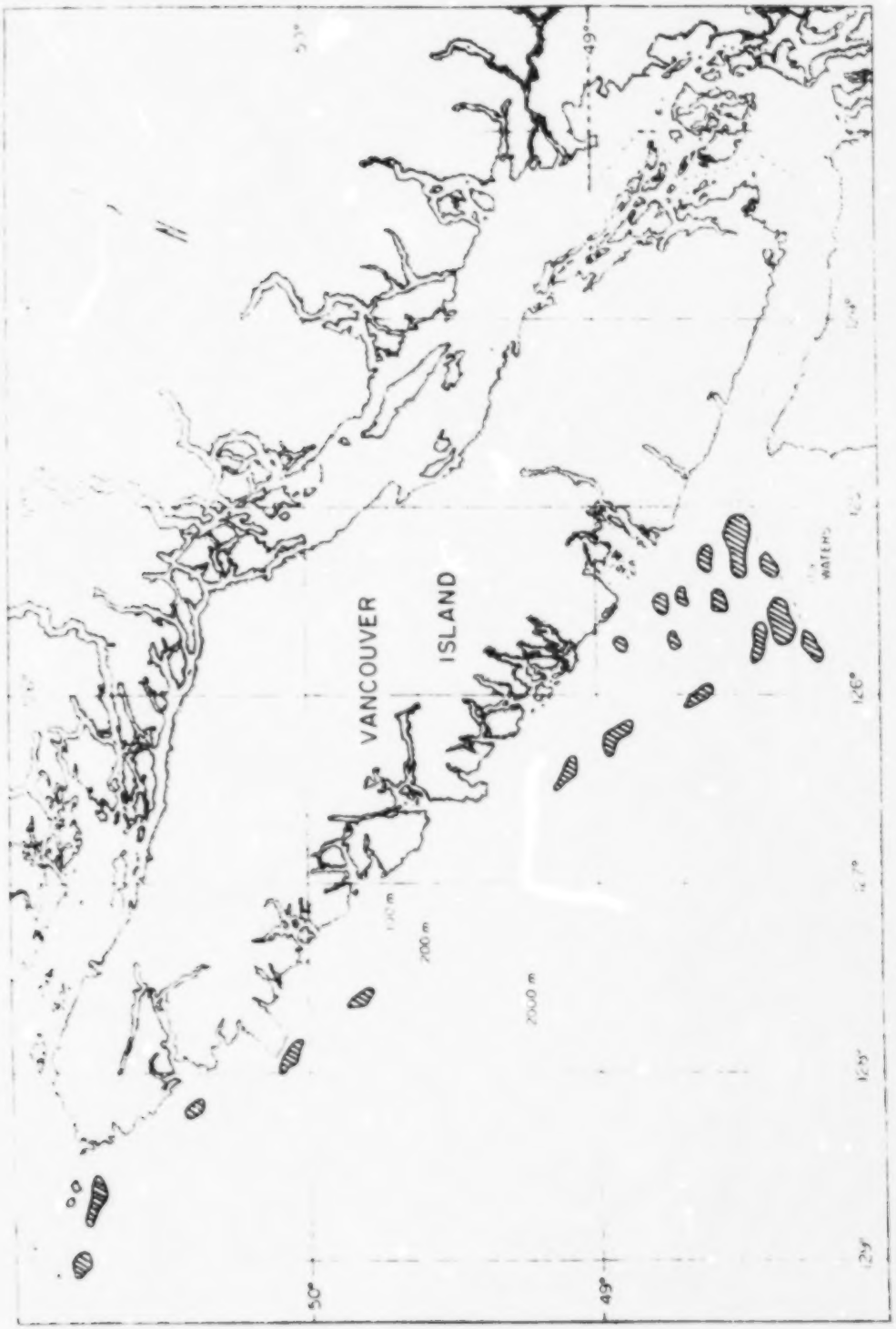


Fig. 5. Coastwide distribution of hake based on the 1987 echogram survey.

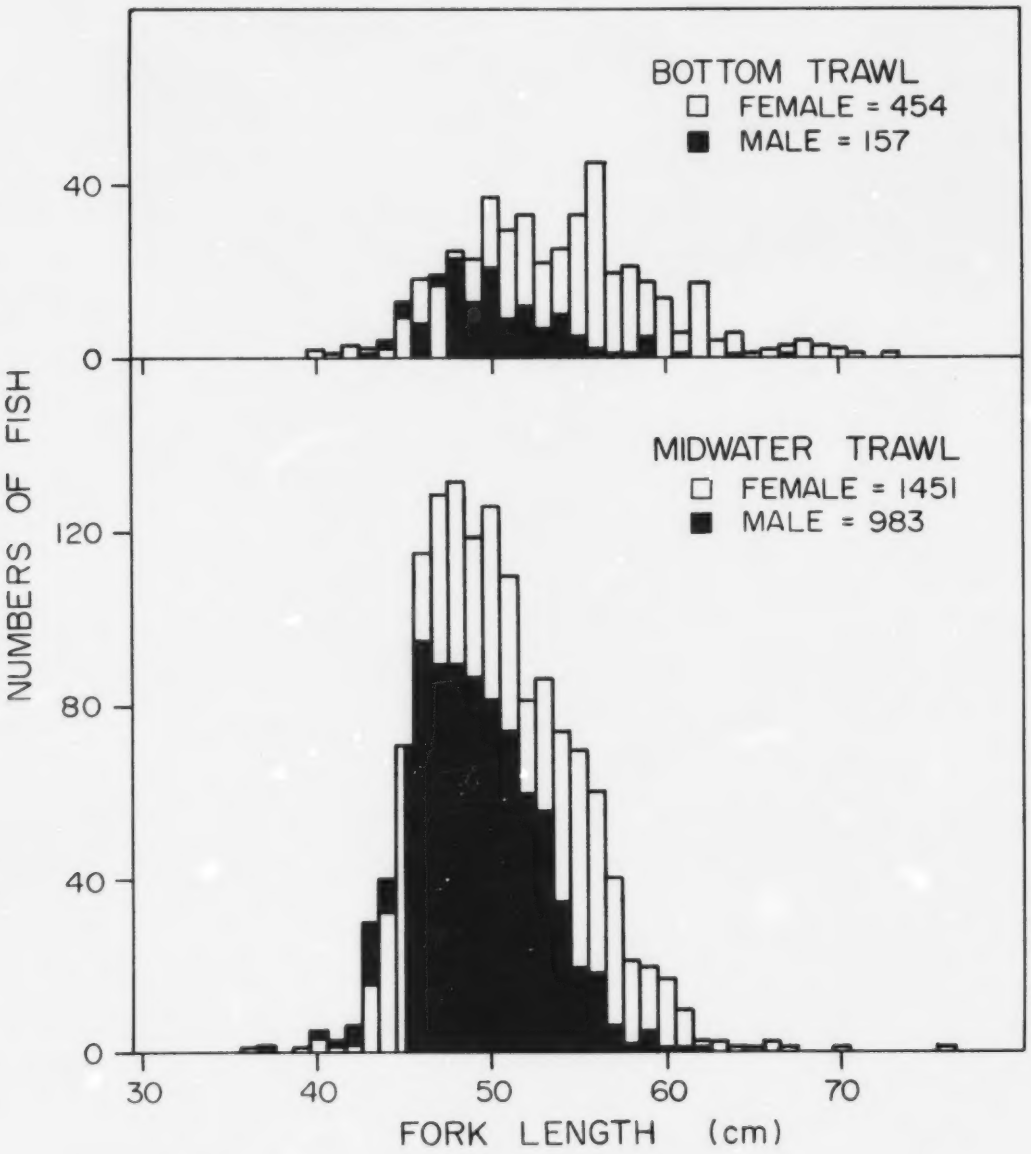


Fig. 6. Length frequency of Pacific hake caught in midwater and bottom tows from offshore waters, August 1987.

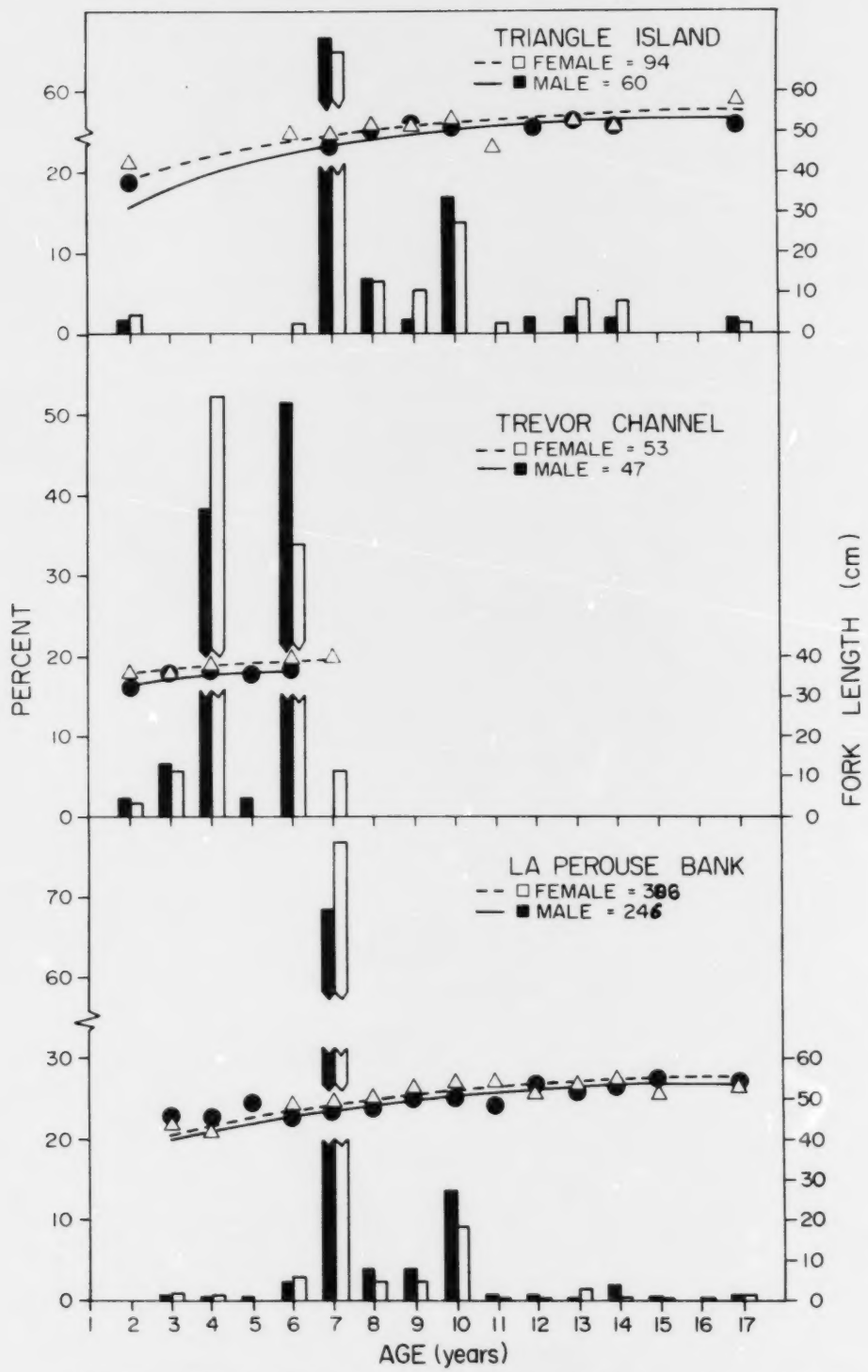


Fig. 7. Age frequency and mean length at age plots by sex of Pacific hake caught offshore and in the inlets, August 1987.

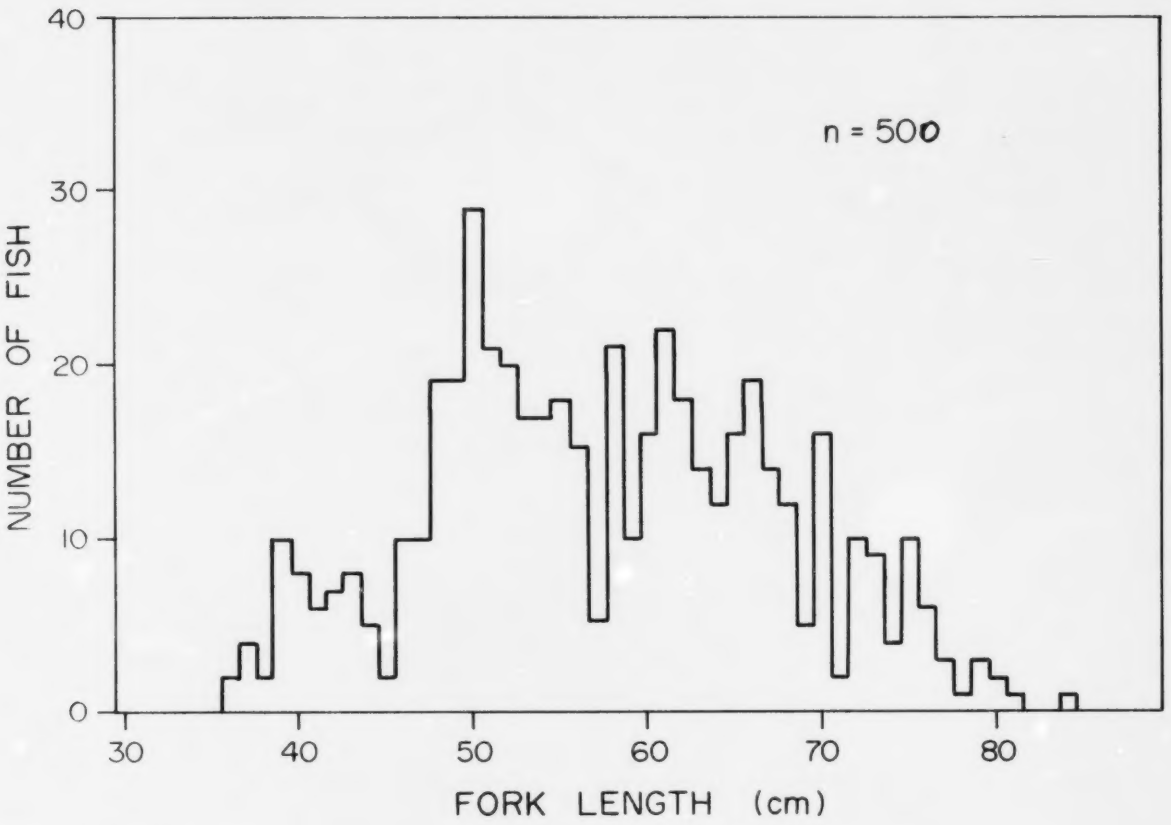


Fig. 8. Sablefish length frequency from bottom tows, August 1987.

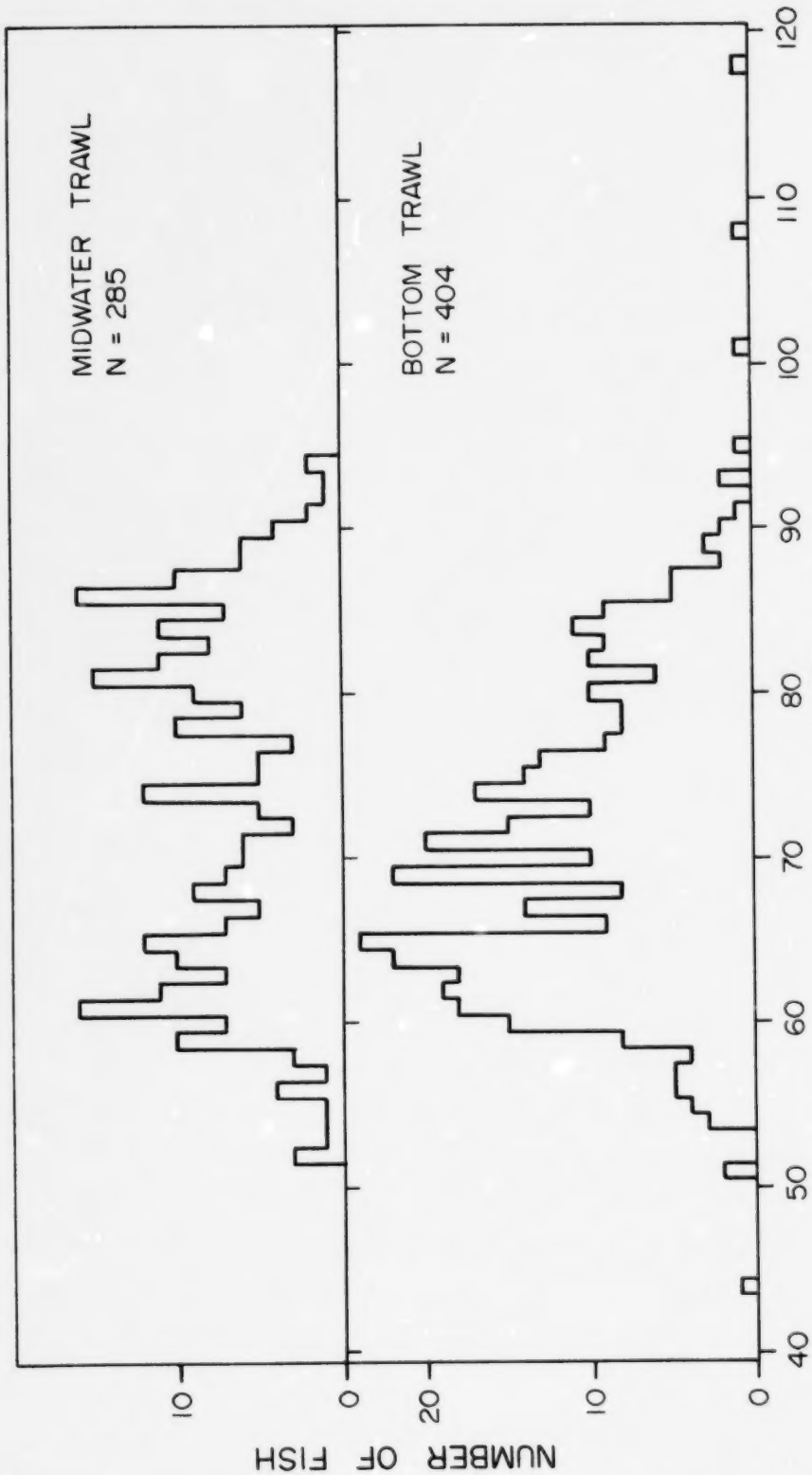
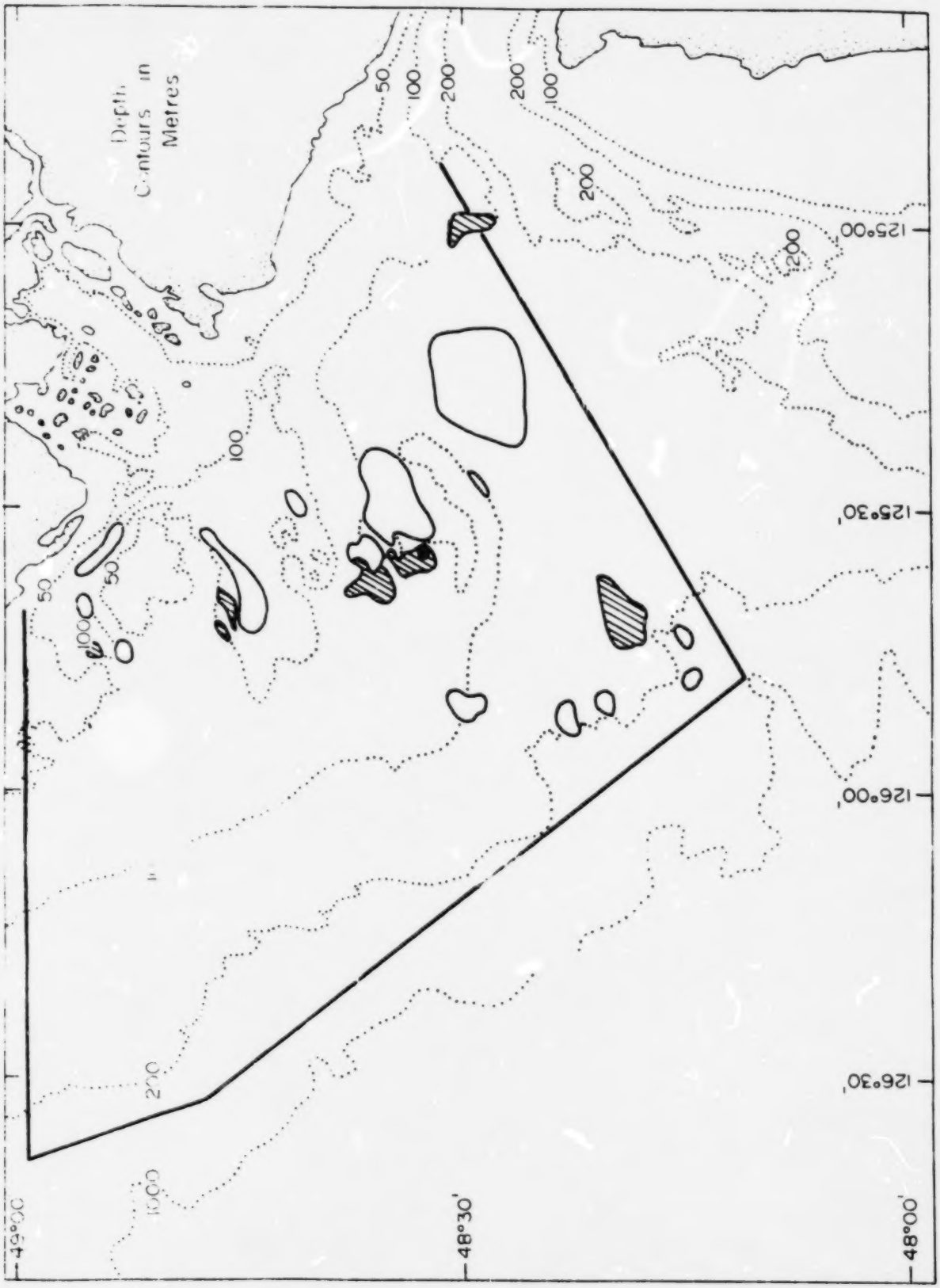


Fig. 9. Spiny dogfish length frequency from midwater and bottom tows, August 1987.

Fig. 10. Major concentrations of Pacific herring (cross-hatched areas) and Pacific hake (encircled areas) encountered during the August 19-29, 1987 survey.


Depth
Contours in
Metres
50
100
200
200
100
200
200
125°00'
125°30'
126°00'
126°30'
48°30'
48°00'
49°00'
50
50
100
100
200
1000

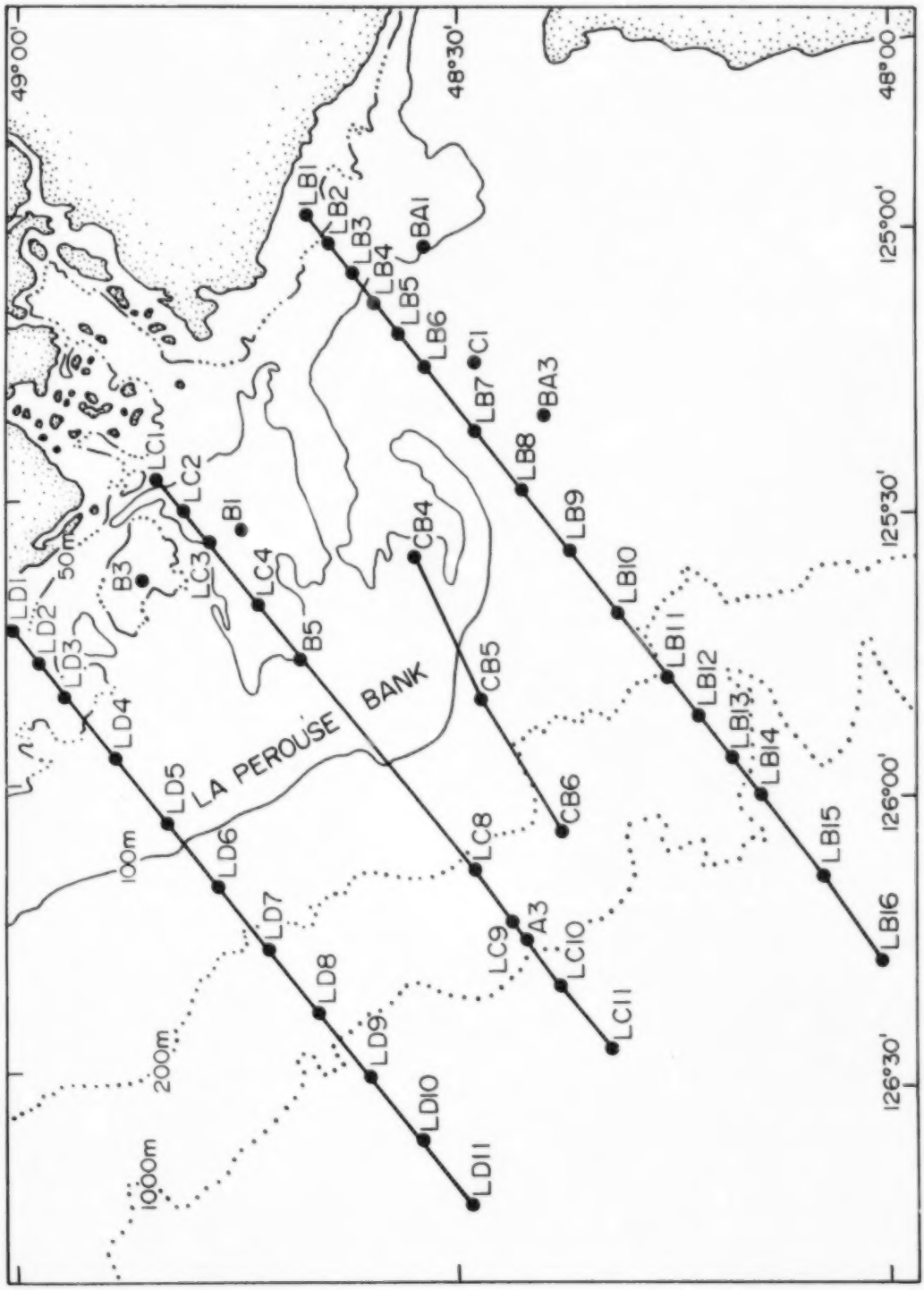


Fig. 11. STD survey line and stations occupied during the August 1987 survey. (La Pérouse project station numbers.)

Fig. 12. Sea surface temperature (^{o}C) profiles, August 1987. (+ represents STD station.)

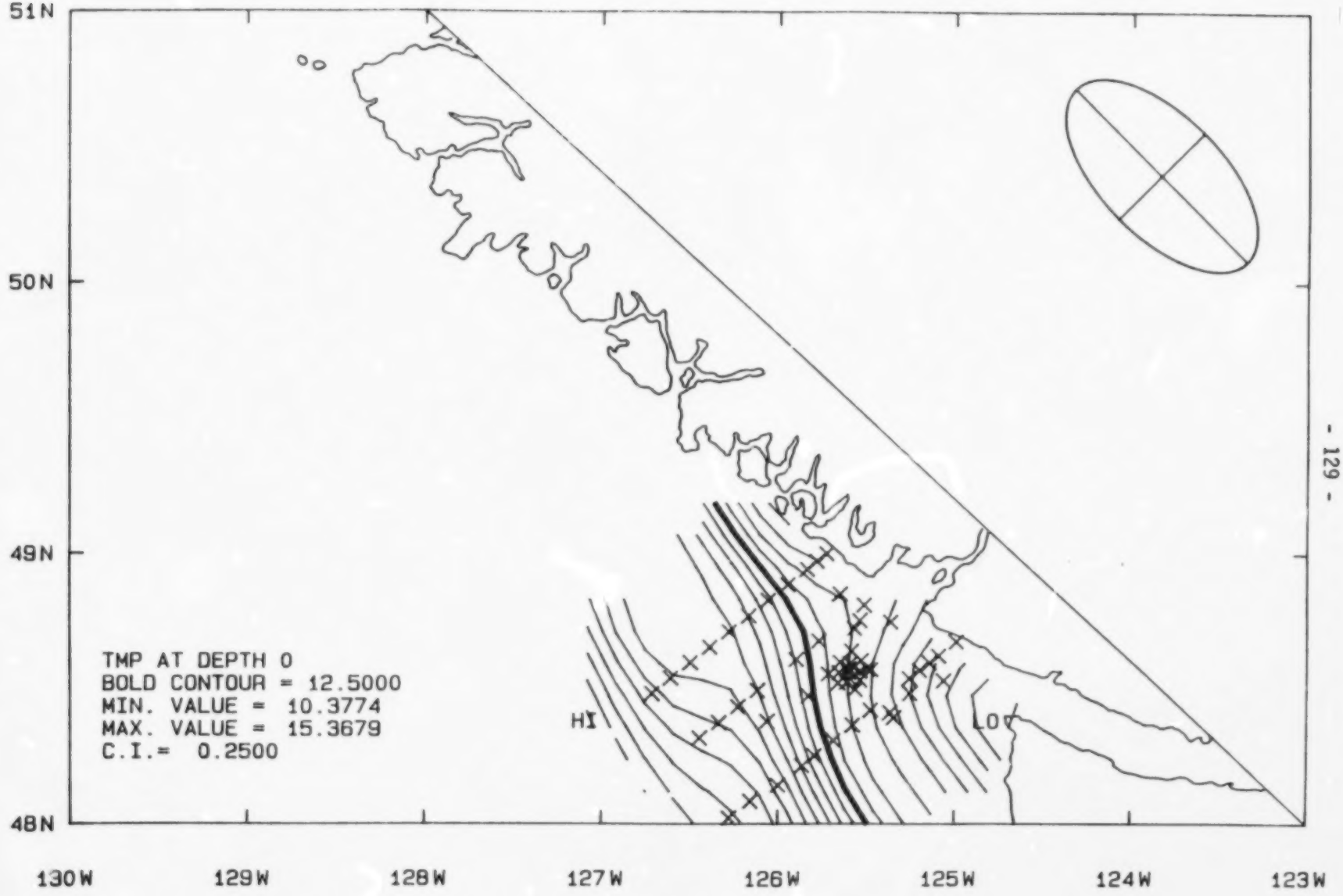

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
TMP AT DEPTH 0
BOLD CONTOUR = 12.5000
MIN. VALUE = 10.3774
MAX. VALUE = 15.3679
C.I.= 0.2500
HI
LO

Fig. 13. Sea temperature (^{o}C) profiles at 50 m depth, August 1987. (+ represents STD station.)

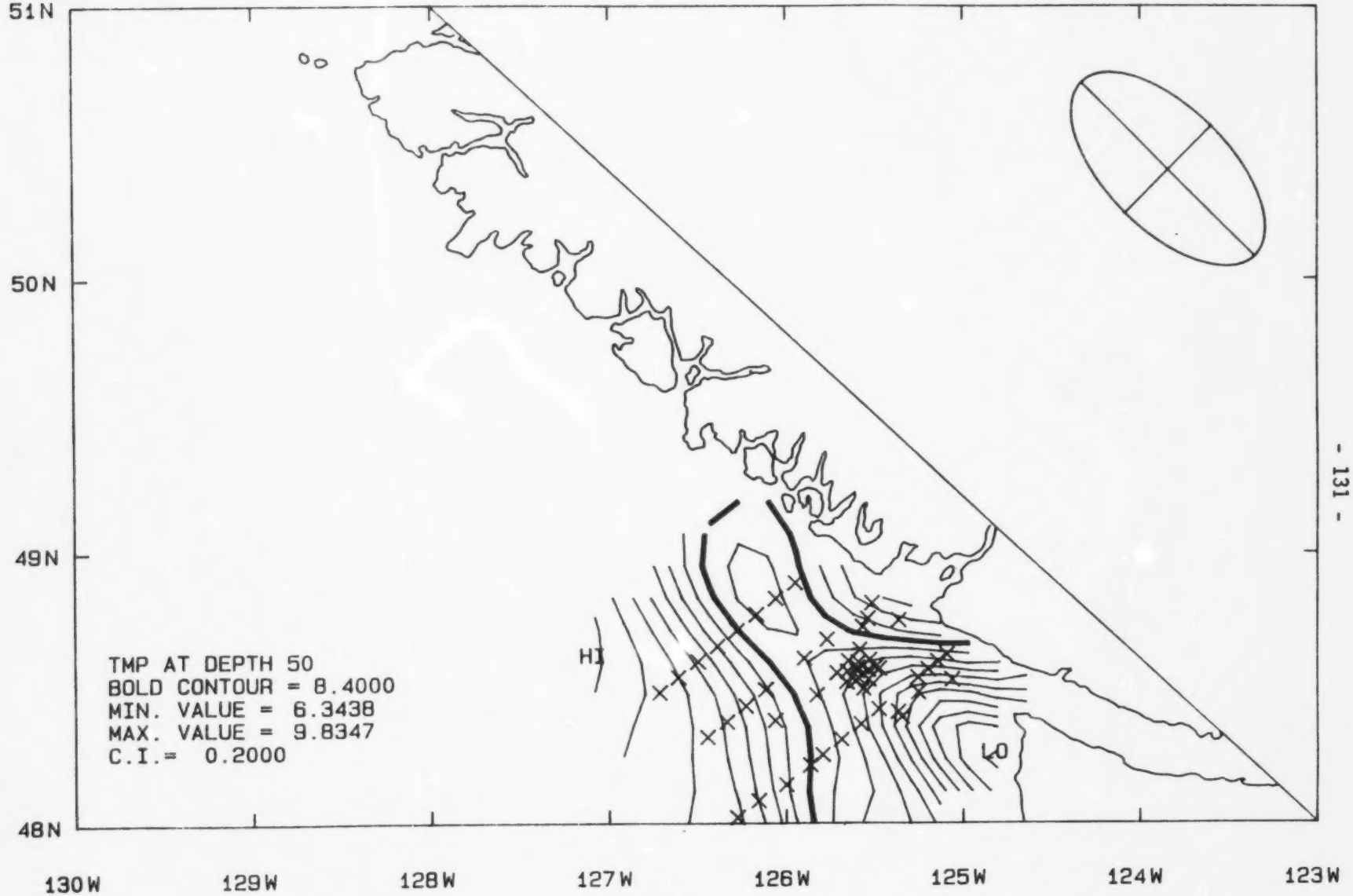

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
TMP AT DEPTH 50
BOLD CONTOUR = 8.4000
MIN. VALUE = 6.3438
MAX. VALUE = 9.8347
C.I.= 0.2000
HI
LO

Fig. 14. Sea temperature (^{o}C) profiles at 100 m depth, August 1987. (+ represents STD station.)

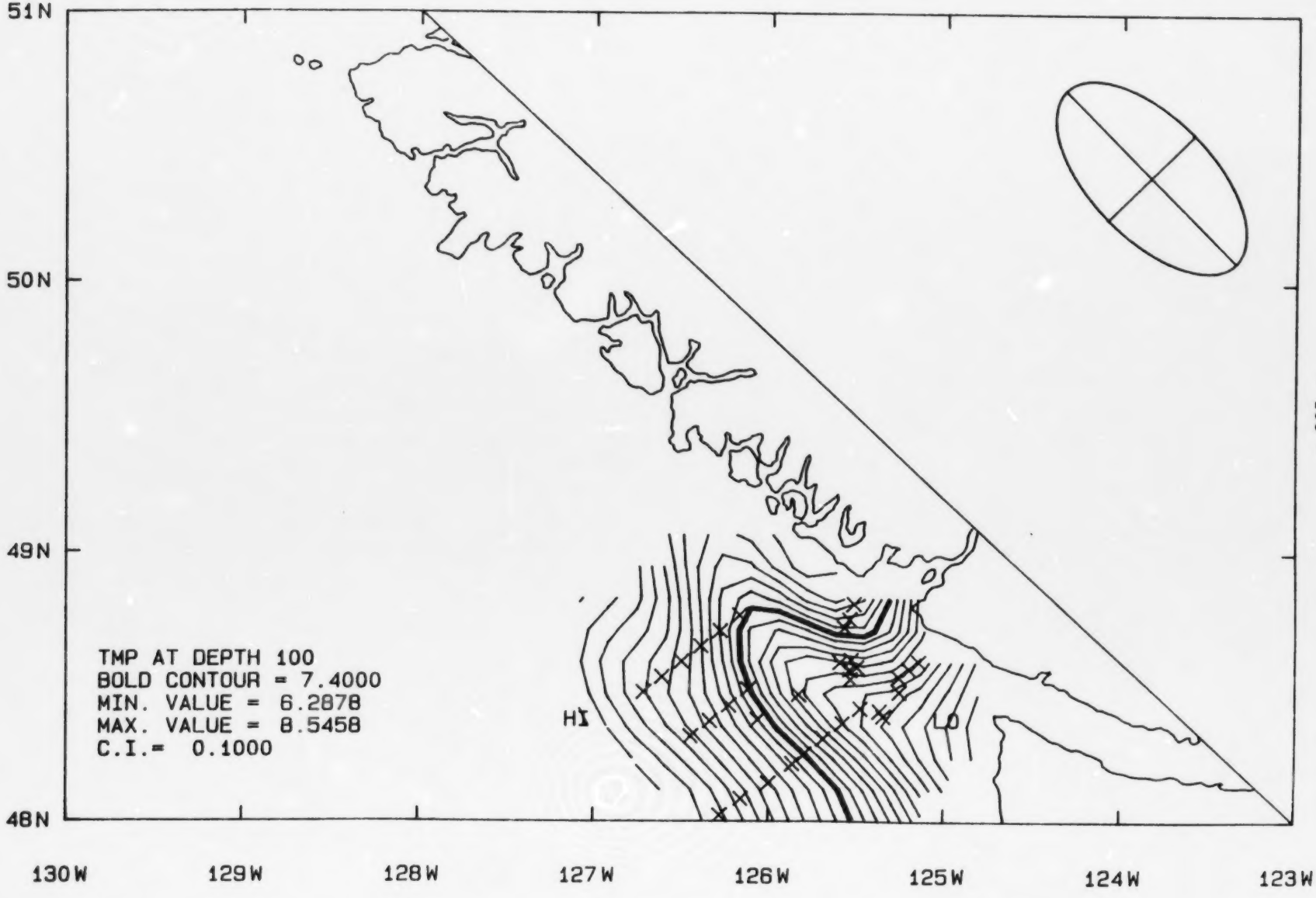

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
TMP AT DEPTH 100
BOLD CONTOUR = 7.4000
MIN. VALUE = 6.2878
MAX. VALUE = 8.5458
C.I.= 0.1000
HI
LO

Fig. 15. Surface salinity ($^{o}/_{oo}$) profiles, August 1987. (+ represents STD station.)

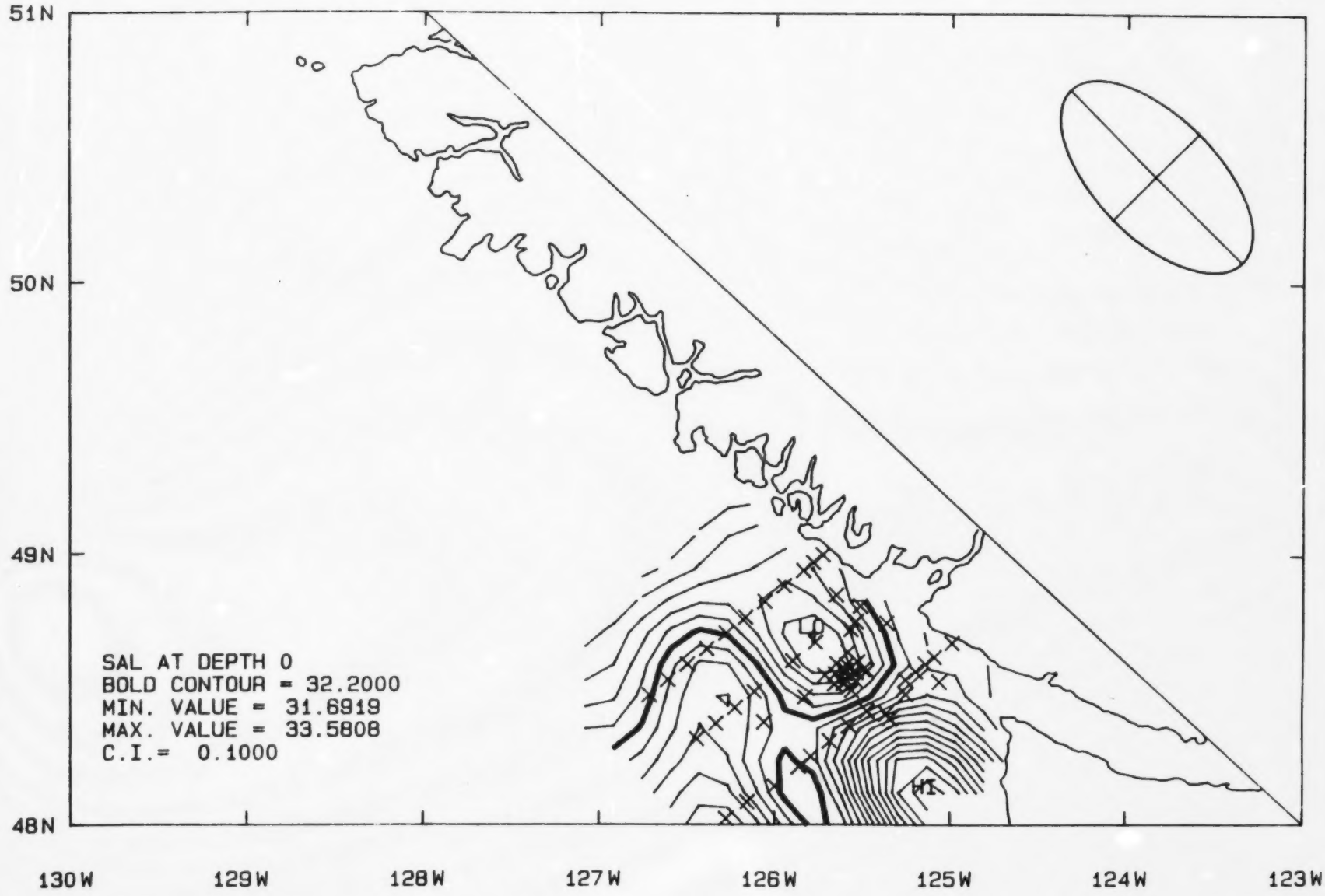

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
SAL AT DEPTH 0
BOLD CONTOUR = 32.2000
MIN. VALUE = 31.6919
MAX. VALUE = 33.5808
C.I.= 0.1000
HI

Fig. 16. Salinity ($^{o}/_{oo}$) profiles at 50 m depth, August 1987. (+ represents STD station.)

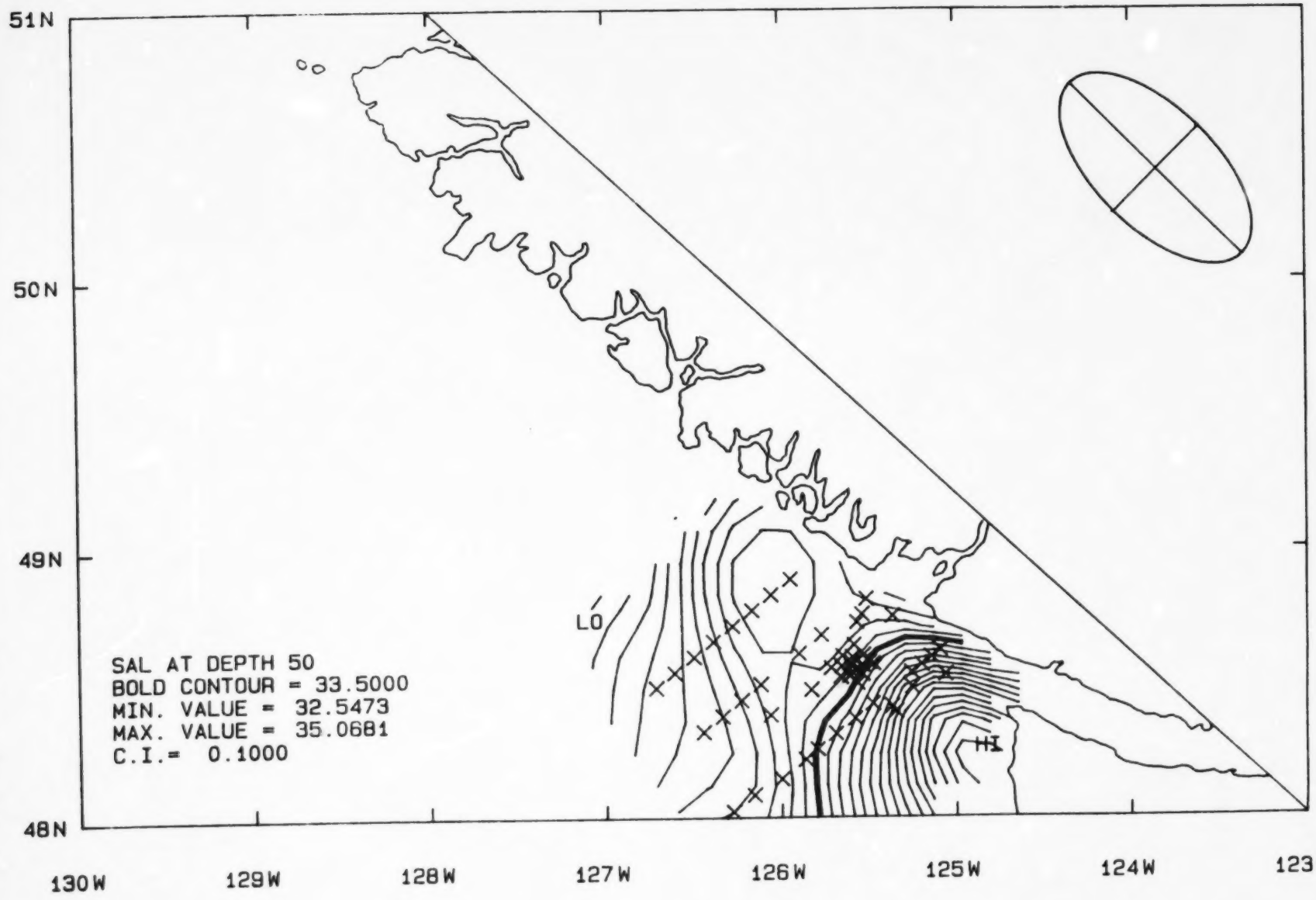

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
LO
HI
SAL AT DEPTH 50
BOLD CONTOUR = 33.5000
MIN. VALUE = 32.5473
MAX. VALUE = 35.0681
C.I.= 0.1000

Fig. 17. Salinity (‰) profiles at 100 m depth, August 1987. (+ represents STD station.)

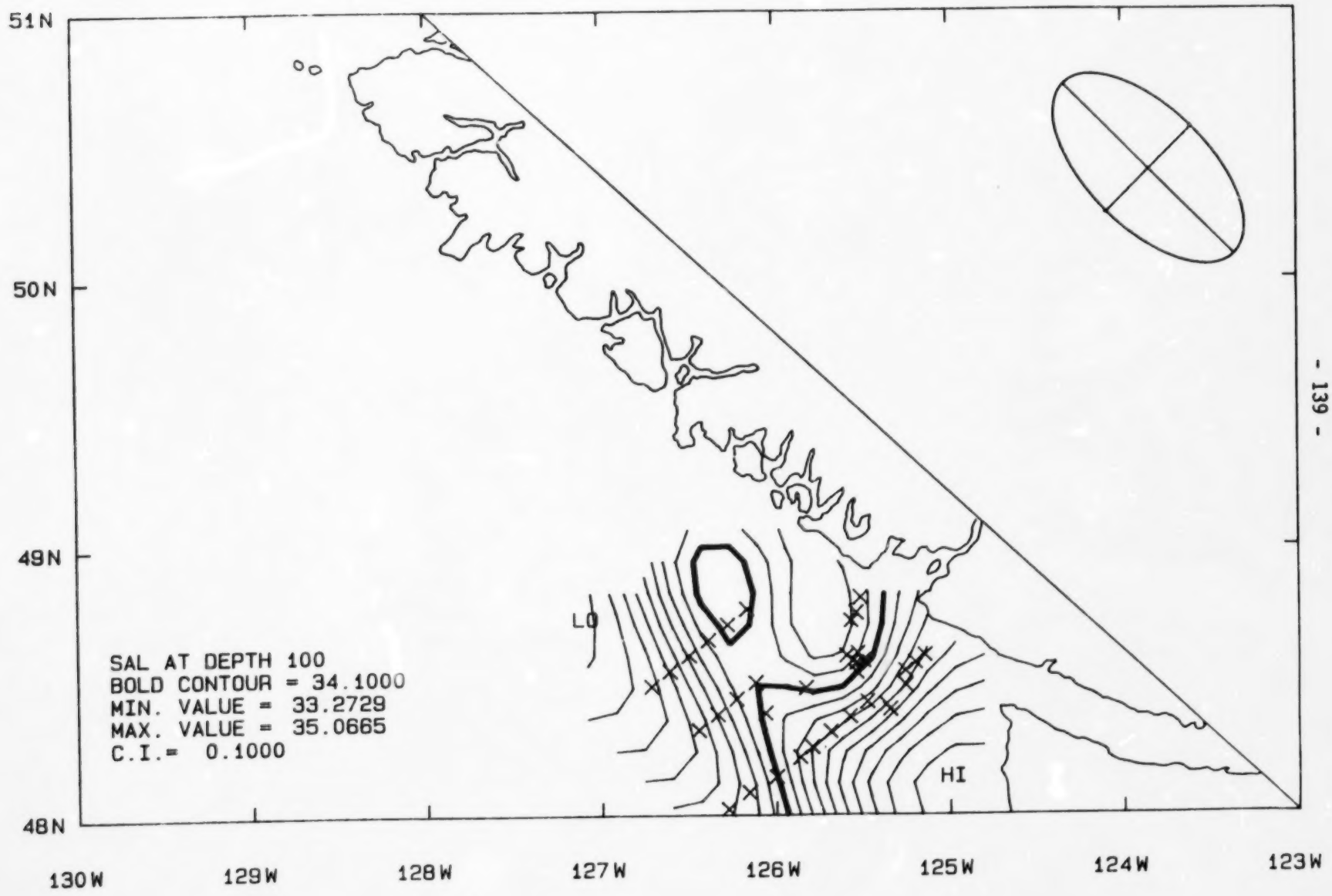

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
LO
HI
SAL AT DEPTH 100
BOLD CONTOUR = 34.1000
MIN. VALUE = 33.2729
MAX. VALUE = 35.0665
C.I.= 0.1000

Fig. 18. Surface density or sigma-t (σ) profiles, August 1987. (+ represents STD station.)

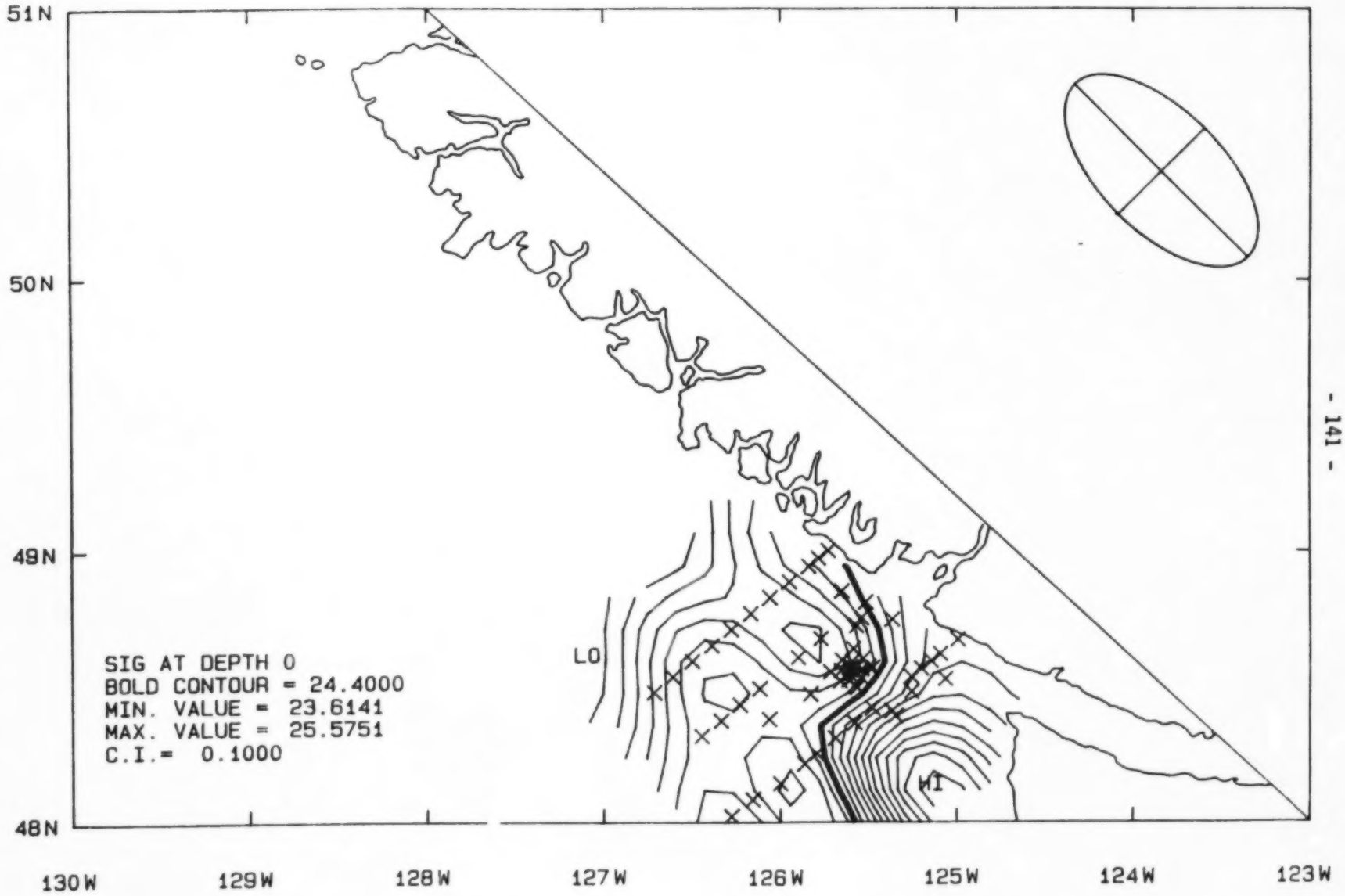

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
SIG AT DEPTH 0
BOLD CONTOUR = 24.4000
MIN. VALUE = 23.6141
MAX. VALUE = 25.5751
C.I.= 0.1000
LO
HI

Fig. 19. Density or sigma-t (σ) profiles at 50 m, August 1987. (+ represents STD station.)

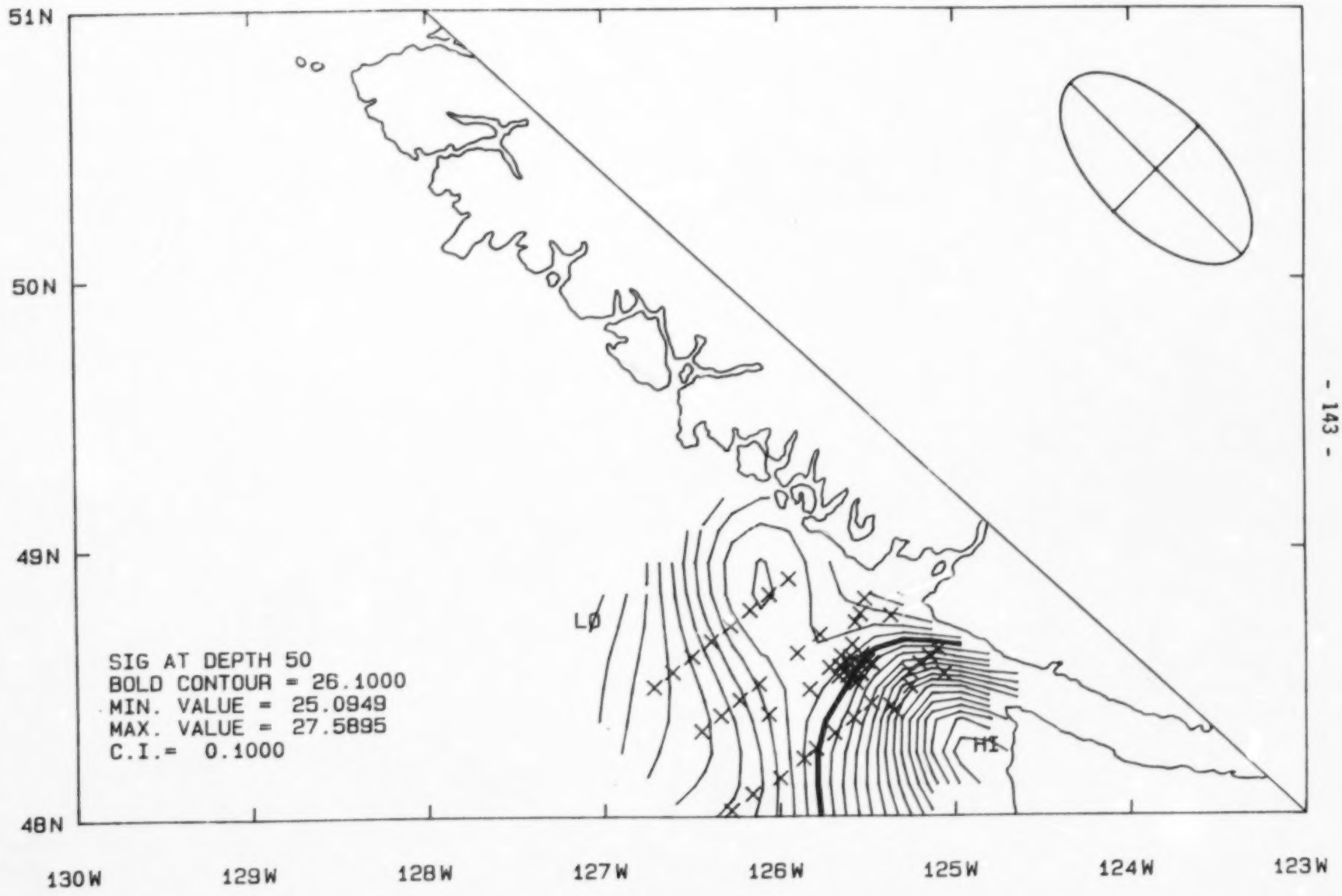

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
LØ
HI
SIG AT DEPTH 50
BOLD CONTOUR = 26.1000
MIN. VALUE = 25.0949
MAX. VALUE = 27.5895
C.I.= 0.1000

Fig. 20. Density or sigma-t (σ) profiles at 100 m, August 1987. (+ represents STD station.)

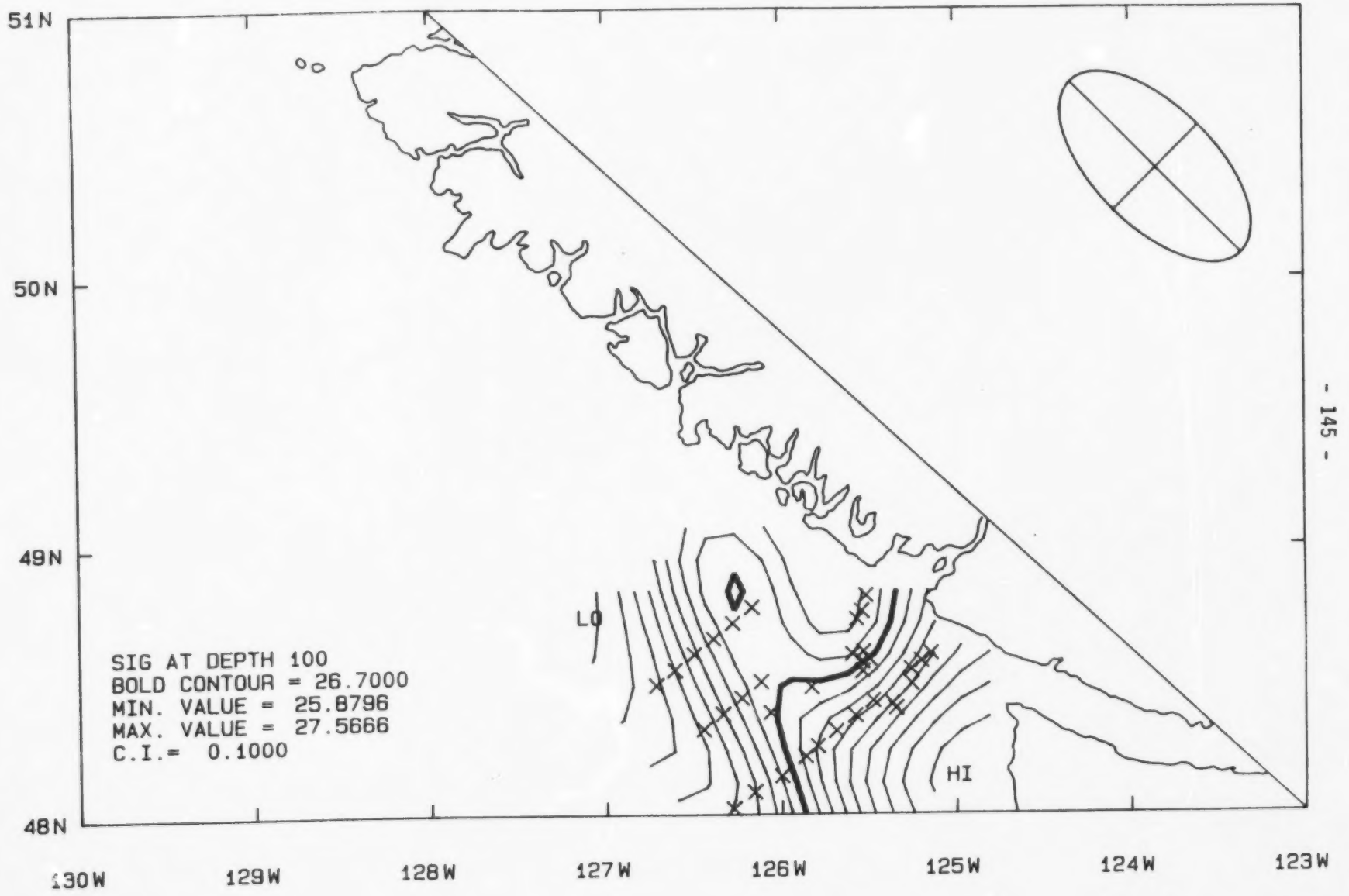
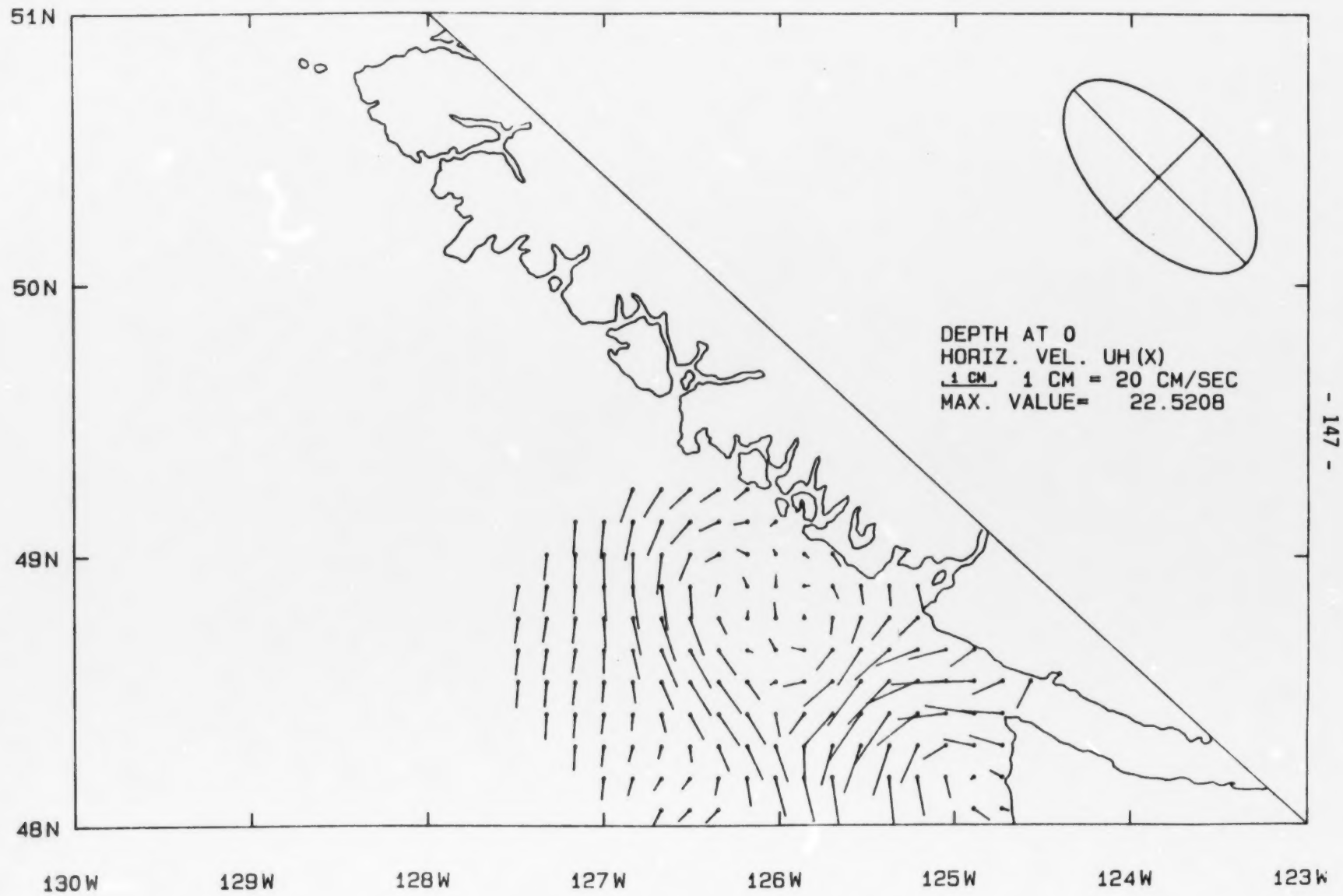

51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
LO
HI
SIG AT DEPTH 100
BOLD CONTOUR = 26.7000
MIN. VALUE = 25.8796
MAX. VALUE = 27.5666
C.I.= 0.1000

Fig. 21. Surface current velocity vectors (cm/sec) (relative to 100 m), August 1987.


51N
50N
49N
48N
130W
129W
128W
127W
126W
125W
124W
123W
DEPTH AT 0
HORIZ. VEL. UH(X)
1 CM
1 CM = 20 CM/SEC
MAX. VALUE= 22.5208

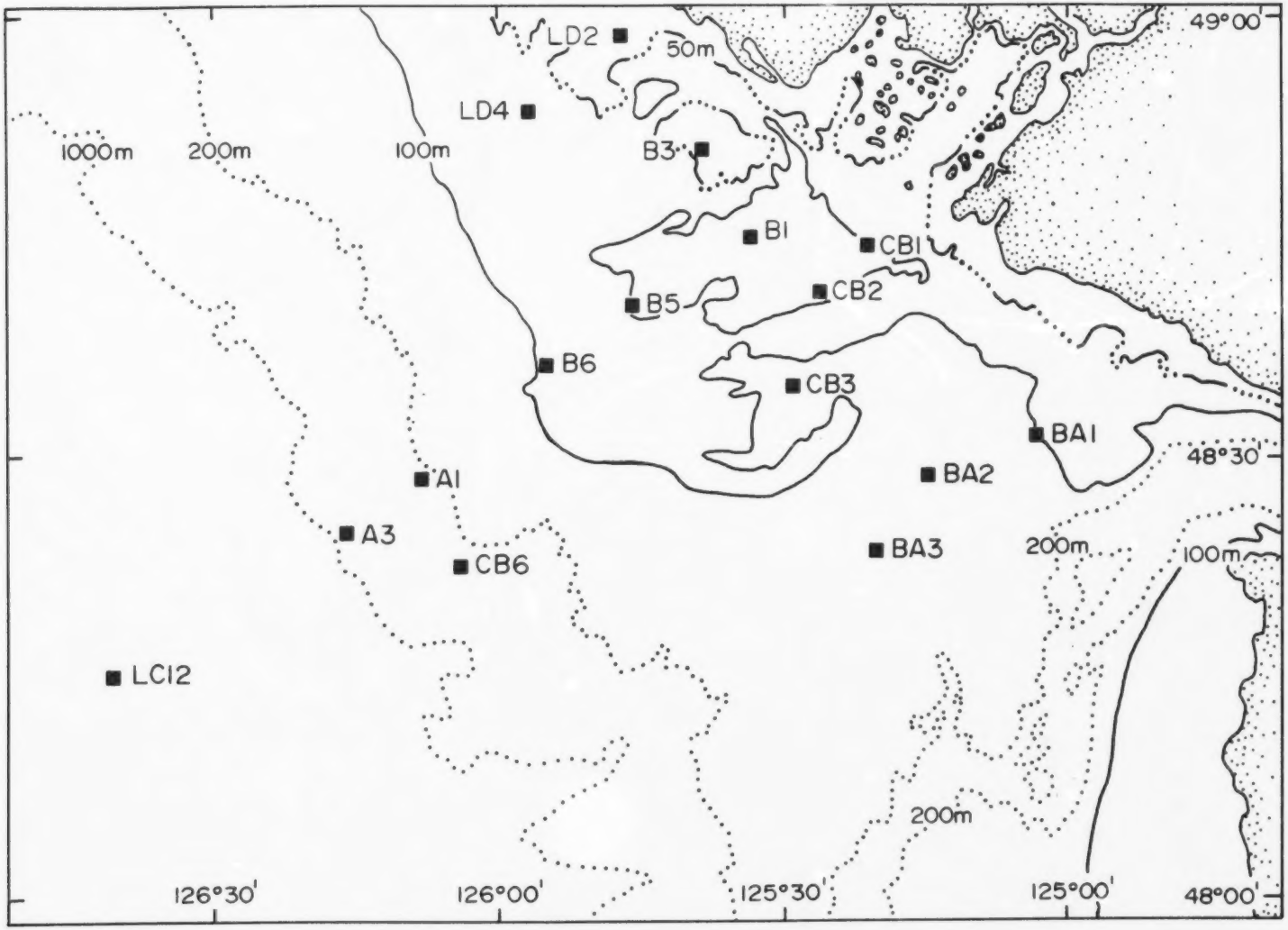


Fig. 22. Vertical plankton haul stations occupied during the August 1987 survey. (La Pérouse Project station numbers.)